



Frontispiece. — *Enceladus gigas* Bonelli, 1813, male. Length of body 45 mm. Photograph by J.S. Scott

# A SYNOPSIS OF THE GENERA OF NEOTROPICAL CARABIDAE (INSECTA: COLEOPTERA)

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The species of Neotropical Carabidae (including traditional carabids, as well as cicindelids, rhysodids and paussids) are grouped in 336 genera, 50 tribes, and nine subfamilies. Additional ranks recognized, where appropriate, are subtribe, group, and subgenus. Keys are provided to the adult stage for taxa of supraspecific rank, except the following: genera of Clivinina (Scaritini); subtribes and genera of Trechini; subtribes and genera of Pterostichini; and subtribes of Lebiini. For each taxon, the geographical range is described in terms of continental and political boundaries, numbers of included lower-level taxa are indicated, and references useful for identification are presented. The following changes are proposed: *Ardistomiellus* Kult, 1950 is made a junior synonym of *Semiardistomis* Kult, 1950; *Reichardtula* Whitehead, new name, replaces *Eupalamus* Schmidt-Goebel, 1846 (not *Wesmael*, 1845); *Macracaanthus* Chaudoir, 1846 is ranked as a genus rather than as a subgenus of *Masoreus* Dejean, 1828; and *Ophyognathus* Chaudoir, 1876 is included as a subgenus of *Macracaanthus*. Seven groups of tribes represented in the Neotropical Region are recognized, based on distribution patterns: exclusively Neotropical (six tribes); Inabrazilian (Old World Tropics, and tropical South America – 10 tribes); Australian-South American (three tribes); Holarctic (northern groups that are localized principally at higher elevations in northern Middle America – five tribes); Holarctic-South American (Trachypachini only); pan-tropical (exclusively or predominantly in the tropics of the world, including the Australian Region – five tribes); and world-wide (on all continents, except Antarctica – 19 tribes). In the West Indies, the family Carabidae is represented by 24 tribes, of which seven (Cicindelini, Scaritini, Rhysodini, Bembidiini, Pterostichini, Harpalini, and Lebiini) have more than a dozen species there.

Os Carabidae (inclusive cicindelídeos, risodídeos e paussídeos) neotropicais são reunidos em 336 gêneros, 50 tribos e 9 subfamílias. O presente trabalho inclui chaves para imagos a nível supra-específico, exceto: gêneros de Clivinina (Scaritini) e de *Pelmatellina* (Harpalini); subtribos e gêneros de Trechini e de Pterostichini; subtribos de Lebiini. Dá-se para cada taxon: distribuição geográfica em termos de limites continentais e políticos; número de categorias imediatamente inferiores; referências de utilidade para identificações. Propõem-se as mudanças seguintes: *Ardistomiellus* Kult, 1950 se converte em sinônimo secundário de *Semiardistomis* Kult, 1950; *Reichardtula* Whitehead, nome novo, suplanta *Eupalamus* Schmidt-Goebel, 1846 (não *Wesmael*, 1845); *Macracaanthus* Chaudoir, 1846, classifica-se como gênero e não subgênero de *Masoreus* Dejean, 1828, e *Ophyognathus* Chaudoir, 1876 se inclui como subgênero de *Macracaanthus*. Com base nos padrões de distribuição, reconhecem-se sete grupos de tribos na Região Neotropical: exclusivamente neotropicais (6 tribos); Inabrasilianas (trópicos do Velho Mundo e da América do Sul, 10 tribos); Australiano-sul-americanas (3 tribos); Holdárticas (grupos setentrionais localizados principalmente nas altas altitudes da América Central, 5 tribos); Holdártico-sul-americanas (só Trachypachini); Pan-tropicais (exclusiva ou predominantemente nos trópicos do globo, incluindo a Região Australiana, 9 tribos). Nas Antilhas os carabídeos estão representados por 24 tribos e apenas 7 (Cicindelini, Scaritini, Rhysodini, Bembidiini, Pterostichini, Harpalini, and Lebiini) com mais de uma dúzia de espécies.

Las especies de Carabidae neotropicales (incluyendo carábidos tradicionales, así como cicindelíidos, risódidos y paussídeos) están agrupados en 349 géneros, 53 tribus y ocho subfamilias. Subtribus y subgéneros están reconocidos además reconocidos además como rangos adicionales para los lugares apropiados. Se proveen claves para el estado adulto de taxa de rango supra-específico, con excepción de los siguientes: géneros de *Pelmatellina* (Harpalini); y subtribus de Lebiini. La extensión geográfica se describe para cada taxon en términos de límites continentales y políticos, se indica el número de taxa de bajo nivel incluidos y se mencionan referencias útiles para la identificación. Se proponen los siguientes cambios: *Ardistomiellus* Kult, 1950 se usa como un sinónimo secundario de *Semiardistomis* Kult, 1950. El nuevo nombre *Reichardtula* Whitehead reemplaza *Eupalamus* Schmidt-Goebel, 1846 (y no *Wesmael*, 1845); *Macracaanthus* Chaudoir, 1846 se coloca como género en vez del subgén-

1. Deceased

ero de *Masoreus Dejean*, 1828, y *Ophryognathus Chaudoir*, 1876 se incluye como el subgénero de *Macracanthus*. Se reconocen 7 grupos de tribus representadas en la Región Neotropical, basados en patrones distintos: exclusivamente neotropicales (seis tribus); inabresianos (trópicos del Viejo Mundo y Sudamérica tropical - 10 tribus); Australiano-Sudamericanos (3 tribus); holdrticos (grupos del norte localizados principalmente a altitudes mayores en el norte de Centro América - 5 tribus); Holárticos - Sudamericanos (*Trachypachini*, únicamente); pan-tropical (exclusivo o predominante en los trópicos del mundo, incluyendo la región australiana - 5 tribus); y mundial (en todos los continentes, excepto Antártica - 22 tribus). En las Antillas, la familia Carabidae está representada por 24 tribus, de las cuales únicamente siete (*Cicindelini*, *Scaritini*, *Rhysodini*, *Bembidiini*, *Pterostichini*, *Harpalini*, and *Lebiini*) cuentan con más de una docena de especies en ese lugar.

## CONTENTS

Frontispiece .....	346
Abstract .....	347
Foreword .....	348
Introduction .....	349
Systematics .....	349
Characteristics of the Family Carabidae .....	351
Geographical Distribution of Carabidae .....	352
Geographical Distribution of Neotropical Carabidae .....	353
Key to Adults of Tribes of Carabidae of the Neotropical Region .....	355
Division Isochaeta .....	370
Subfamily Cicindelinae .....	370
Subfamily Trachypachinae .....	375
Subfamily Nototylinae .....	375
Subfamily Cicindisinae .....	375
Subfamily Paussinae .....	375
Division Anisochaeta .....	378
Subfamily Omophroninae .....	378
Subfamily Carabinae .....	379
Subfamily Pseudomorphinae .....	451
Subfamily Brachininae .....	452
Acknowledgements .....	453
References .....	454
Index .....	479

### FOREWORD

(by George E. Ball)

The original manuscript on which this paper is based was received for comments from its author in January, 1976. During the fall of that year, he and I were planning to undertake a joint venture in study of carabid systematics, and this included completion of a treatment of the genera of Neotropical Carabidae. It was not intended that I should be co-author of this segment of the work: rather I was to offer advice and criticism. Regrettably, Hans Reichardt was killed in a tragic automobile accident in July, 1976, and that ended our plans.

The tragedy would be compounded if the general synopsis of Neotropical Carabidae died with its author. As I received it, the work was incomplete. What was to be done? Lacking both the necessary detailed knowledge of South American carabids and time that would be required to become sufficiently knowledgeable to complete the manuscript as Hans would have been able to do, I undertook to make those additions and modifications that I knew would be improvements. This included arranging for the illustrations, whose sources are duly acknowledged. I also added information about a few groups that enter northern Mexico, to increase the

range of coverage, and solicited and received advice and assistance from Terry L. Erwin and Donald R. Whitehead. Our additions are indicated in the text by our initials, in square brackets. Generally, though, I restricted my contributions to those that would be made by a conscientious editor. Thus, this paper is less than perfect, but much better than what was previously available to those interested in Neotropical Carabidae.

The manuscript was written in English, and so it has been published in that language. However, to increase its usefulness to Latin Americans, a Portuguese translation is provided of the abstract and to the key to Tribes.

I hope that this publication is of help to all of those who wish to identify Neotropical carabids. But, above all, I hope that it may encourage and inspire some young South American to carry on the work that was brought to a halt with the untimely death of my friend and respected colleague.

## INTRODUCTION

This work was started about four years ago, and summarizes the systematics of the family, with keys to subfamilies and tribes, a discussion of the individual tribes, with keys where possible to genera and a list of genera with comments on bibliography and known species, including the scant information on immature stages and way of life. Originally the work was intended to be restricted to Brazil, but this geographical limitation is not justified, and I have extended it to include the whole of the Neotropical Region.

Its importance is obvious. The family Carabidae is one of the few larger families of beetles (more than 30,000 species in the World, and at least 5000 in the Neotropics), which has been reasonably well studied in the different parts of the world. The Neotropical fauna has not been studied as a whole, and the desirable comparisons with other faunas become very difficult, if not impossible.

### Systematics

The family Carabidae is highly diverse and its classification is not well understood. Foundations for the system were laid by Lacordaire (1854); even before this, Dejean (1825-1831) although having dedicated five volumes to the description of genera and species, failed to elaborate a solid structure for the classification of the family. Following Lacordaire, up to the 1880's, Chaudoir published many papers which improved parts of the system established by the former author.

In the present century the first contribution, which brought about a radical alteration in the classification of the family, was provided by Sloane (1923a and b). He introduced the concept of the Carabidae Uniperforatae and Biperforatae, which is based on the presence of one or two internal orifices of the anterior coxal cavities of adult beetles. There is no question about an advanced step resulting from this classification, in spite of the difficulty to determine the character state for a specimen. This requires removal of the fore coxa.

The next step - and the most revolutionary - was supplied by Jeannel. In two fine treatises on the Carabidae of France (1941, 1942) and of Madagascar (1946-1949), and based mainly on two characters (position of the spurs of the anterior tibiae, and type of male genitalia) he arranged Carabidae in 46 families, grouping them into six Divisions. By employing a narrower family concept than currently accepted, this French author raised the existing tribes and subfamilies to family category. Such a procedure, has been strongly criticized (e.g. Darlington, 1949), and has been accepted mainly by French authors.

Table 1. Classification of Suprageneric Taxa of Family Carabidae Represented in or near the Neotropical Region.

I.	Division ISOCHAETA	Division ANISOCHAETA (con't.)
	Subfamily CICINDELINAE	Subfamily CARABINAE (con't.)
	Tribe CTENOSTOMATINI	Tribe ZOLINI
	Tribe MEGACEPHALINI	Tribe TRECHINI
	Tribe CICINDELINI	Tribe PANAGAEINI
	Subfamily TRACHYPACHINAE	Tribe MORIONINI
	Tribe TRACHYPACHINI	Tribe CATAPIESINI
	Subfamily NOTOTYLINAE	Tribe PTEROSTICHINI
	Tribe NOTOTYLINI	Tribe LACHNOPHORINI
	Subfamily CICINDISINAE	Tribe AMARINI
	Tribe CICINDISINI	Tribe PERIGONINI
	Subfamily PAUSSINAE	Tribe CNEMACANTHINI
	Tribe OZAENINI	Tribe CHLAENIINI
	Tribe PAUSSINI	Tribe OODINI
II.	Division ANISOCHAETA	Tribe LICININI
	Subfamily OMOPHRONINAE	Tribe HARPALINI
	Tribe OMOPHRONINI	Tribe PELECIINI
	Subfamily CARABINAE	Tribe MASOREINI
	Tribe CARABINI	Tribe PENTAGONICINI
	[Tribe CYCHRINI]	Tribe AGRINI
	Tribe NOTIOPHILINI	Tribe ODACANTHINI
	Tribe HILETINI	Tribe CTENODACTYLINI
	Tribe LORICERINI	Tribe LEBIINI
	Tribe SIAGONINI	Tribe DRYPTINI
	Tribe MIGADOPINI	Tribe GALERITINI
	Tribe SCARITINI	Tribe ZUPHIINI
	Tribe RHYSODINI	Tribe HELLUONINI
	Tribe APOTOMINI	Tribe EUCHEILINI
	Tribe PSYDRINI	Subfamily PSEUDOMORPHINAE
	Tribe BROSCINI	Tribe PSEUDOMORPHINI
	Tribe BEMBIDIINI	Subfamily BRACHININAE
	Tribe POGONINI	Tribe BRACHININI

The main criticism we have to make of Jeannel's system is his having applied a *suigeneris* family concept to a small segment of the Coleoptera. In Grasse's treatise (Jeannel and Paulian, 1949), this unequal treatment is made the more manifest if we compare, e.g., Caraboidea (46 families) and Phytophagoidea -chrysomelids, cerambycids, weevils (nine families). If all of the coleopterous families as presently understood were similarly reclassified, there would result several hundred families, thus making the classification of the order devoid of a fundamental logic. To make its study easier we would then be forced into the situation Lindroth (1969: XVII) condemned: the taxonomic language would become a "secret code for a handful of conspirators", with recognition of even taxa of tribal rank becoming the special preserve of few specialists.

Notwithstanding all this, Jeannel's system pioneered and its solid structurally based part has been generally accepted. However, many groups were based on superficial examination

of certain exotic genera, resulting in erroneous conclusions. Thus, the whole system should be restudied.

More recently Ball (1960) and Lindroth (1961-1969) produced systems similar in form and content, for the classification of the Carabidae, unfortunately, however both restricted their study to the Nearctic fauna.

The system presented in Table 1 is based mainly on the work of these two authors.

A further debatable point in the systematics of the Carabidae, intimately connected with the family concept as discussed above, is the genus concept. In this case there is also two currents: a) the "French" one, or the "splitters", those who restrict the genera to few species based on few characters (frequently, the genitalia only); and b) another current led by English speaking authors, the "lumpers", who admit very large genera, generally of world wide distribution. I adopt here the "lumper" tendency, as in my previous papers.

### Characters of the family

**Adults (Fig. 1).** Size varied, from about 1.0 mm (some bembidiines) to 70 mm (*Enceladus gigas* and some *Scarites* specimens; in other faunas there are species with larger adults). In general body relatively flattened, slightly convex. Color generally black or dark brown, but members of many species brightly colored and/or patterned.

Head (Fig. 1a and b) relatively large, slightly or markedly constricted behind eyes. Eyes bulged, hemispheric; reduced in or absent from a) cavernicolous species (which are not common in the American tropics, e.g. *Schizogenius ocellatus* Whitehead, 1972, from caves in southern State of São Paulo), or b) endogenous species (whose members live in humus and soil; these being practically unknown in our fauna). One, two or three pairs of supra-orbital setae. Antennae varied, generally filiform or miniliform, of 11 articles (reduced in number and clavate in paussines), antennomeres 3-4 either glabrous or wholly pubescent. Mouth-parts various. Mandibles arched, sharp, with one or more teeth on inner margin, most with row of setae on ventral surface; with or without seta in scrobe. Labrum in general small (hinged to clypeus) with variable number (generally six) of long dorsal setae at front margin; on ventral surface as a rule with curved row of short setae. Maxillae (Fig. 1d) each with palpus of four articles; one or two articulated palpiform galea; lacinia with inner margin strongly hairy-spinose, terminated in strong tooth, articulated (Cicindelinae) or not. Labium (Fig. 1c) with mentum, with or without median tooth, lateral lobes prominent; palpi each of three articles (palpomeres) similar or different from the maxillary ones (pilosity on penultimate article of taxonomic value), terminal article frequently of different shape from basal articles. Ligula single, with or without apical setae; paraglossae membranous. Gular sutures separate or fused (both types occurring in same tribe, e.g., Scaritini).

Prothorax. Pronotum (Fig. 1a) shape various with median groove bifurcate anteriorly, lateral branches variously developed; laterally generally marginate, most members with one or two pairs of marginal setae. Notopleural sutures and proepisternum-prosternum clearly defined (obscure in Apotomini). Anterior cavities open (Fig. 2a) or closed (Fig. 2b) behind; mono- or biperforate internally. Prothorax in members of Scaritini, Siagonini (Frontispiece) and Apotomini connected to mesothorax by peduncle.

Scutellum variously developed, completely hidden in members of some taxa.

Elytra (Fig. 1a) fused or not along suture; sloped laterally, epipleuron (Fig. 1b, epl) not visible from above. Striae and intervals (Fig. 1a, 1 str. 1 int) counted from suture (some authors consider sutural interval as independent); also sutural stria (= striole Fig. 1a, scs) in interval 1 or 2, short in members of most taxa, but prolonged to apex in Migadopini and Monolobini; setiferous punctures absent or present on striae and/or on intervals, especially on interval 3 and near margin (umbilical series). Apex truncate or obtuse or acutely pointed, pygidium exposed or not.

Hind wings generally developed, with complex, systematically important venation system, which has been little used in classification. Costa well sclerotized, generally with microstriae stridulatory area (in Cicindelinae with resounding chambers in abdomen, see Freitag and Lee, 1972). Members of many species brachypterous or apterous (a problem studied specially by Darlington 1943). Wings folded under elytra in repose (Forbes, 1922).

Meso and metasternum (Fig. 1b and 3a and b, mse, mte), connected laterally with respective episterna (Fig. 3a and b, emp<sup>1</sup>, emp<sup>2</sup>). Mesepimera extended to middle coxal cavities, that is, separating mesepisternum from metepisternum (disjunct coxal cavities Fig. 3a) or mesepisterna not touching and closing the mesocoxal cavities externally (conjoint coxal cavities, Fig. 3b). Metasternum with transverse suture adjoined to hind coxae.

Legs (Fig. 1a) cursorial, variously developed; fossorial in Scaritini. Posterior trochanters more or less appendiculate. Anterior tibia with pubescent pre-apical notch on inner side, the antenna cleaner used to clean the antennae (apparently absent only from members of Nototylini; studied by Hlavac, 1971 in different tribes). Position of spurs on anterior tibiae taxonomically important. Tarsi pentamerous; anterior tarsomeres (and median ones in some taxa) of males dilated (three or four basal articles) with ventral vestiture of adhesive setae.

Abdomen of members of most taxa with six sterna (Fig. 1b) normally exposed (seven or eight sterna exposed in Brachiniae); sternum I divided by hind coxae. Each sternum of most specimens with one pair of ambulatory setae near median line; in many groups, last normally exposed sternum (sub-pygodal sternum) with two (males) or four (females) setae near posterior margin. Terga weakly sclerotized.

Larvae (Fig. 4). Diagnostic characters (after van Emden, 1942:3). — Legs each with five articles (coxa, trochanter, femur, tibia and tarsus), with one or two claws. Labrum and clypeus fused with frons. Mandibles without suctorial channel, without prostheca and with cutting margin simple. Maxilla with short cardo of two half rings placed on same axis as stipes, external lobe inserted into stipes. No branchiae fringe. Eight pairs of abdominal spiracles about same size as others and at same sublateral position; ninth and tenth segments distinct.

In spite of van Emden's innumerable papers, which culminated in "A key to the genera of larval Carabidae" (1942), little is known about larvae of Carabidae. That author, who did not include either Cicindelinae or Paussinae in his studies, knew representatives of only 50% of the tribes. At that time the larvae of only 23 tribes of the Neotropical Carabidae were known, and only those of 10 were based on Neotropical genera. Since then, the only addition seems to be a pseudomorphine larva briefly described by Lenko (1972), a pentagonicine described from Australia by Moore (1965), and Migadopines and Zolines described by Johns (1974).

Little is known about habits of larvae. The few Neotropical examples studied by van Emden were provided with the following bionomic notes: "under tree bark" (*Pachyteles*, *Scarites* (*Distichus*), *Tachys*), "in fruit of *Ficus glabrata* (*Barysomus*)"; "on leaves or shrubs" (*Onota* and *Calleida*); "in nest of *Atta sexdens* (*Scarites semicarinatus* and *Physea setosa*)", "in the vicinity of nest of *Eciton*" (*Galerita*), "on rotting banana trunk" (*Cratocerus sulcatus*). Lenko collected larvae and pupae of *Pseudomorpha* sp. in nest of *Camponotus rufipes*. Larvae of various species of *Lebia* and *Brachinus* are ectoparasitoids on coleopterous pupae.

Cicindelinae larvae, according to van Emden (1942:3), differ from those of the other sub-families by sensorial hooks on the dorsum of the abdominal segment 5, by the palpiger connate, with basal segment of external lobe. A considerable number of larvae and pupae of Brazilian Cicindelinae were described by Zikan (1929).

Larvae of Paussini, only known from the Old World, have a prostheca and legs with a greater number of articles (van Emden, 1942:3).

### Geographical distribution of Carabidae

In a time when Wegener's theory was practically abandoned and when the concept of "Continental Drift" was not taken seriously and Tectonic Plate theory had not been conceived, Jeannel (1942) attempted an explanation of the geographical distribution of the carabids based on rifting land masses. Briefly, this author organizes the Carabidae into the following zoogeographic groups:

1. *Gondwanian lineages*. Lineages whose origin must be sought at the beginning of the Mesozoic (Triassic) or even at the end of the Paleozoic (Permian), in spite of the absence of fossils. Three lineages are recognized here, two of which are represented in the Neotropical Region.

1.1 *Antarctic-Australo-South American lineages*. Originated on sub-polar areas of Gondwana, these lineages persist in "sub-Antarctic America", Australia and New Zealand. Examples: some Trechini, Broscini and Migadopini.

1.2 *Inabrazilian lineages*. Jeannel proposed the term "Inabrézie" for the Gondwana lands composing the Brazilian Massif, tropical and southern Africa, Madagascar and India, during the Mesozoic (Jurassic and Cretaceous) before appearance of the Atlantic Ocean. All of the Inabrazilian lineages are tropical, many of them having moved to the Northern hemisphere by the end of Cretaceous time and colonized the Palaearctic Region. Examples: genus *Calosoma*, (*sensu lato*) Apotomini, Enceladini, Hiletini, Dryptini.

1.3 *Oriental gondwanian lineages*. These occupied regions adjacent to the Indian Ocean during Mesozoic time. Many of them broke off from Indo-African groups, crossed the Tethys

sea by the end of Cretaceous time and spread over the Mediterranean Region. Many forms managed to migrate into Atlantic archipelagos, east of North America and the Antilles before appearance of the North Atlantic, in Eocene time.

2. *Holarctic lineages.* These originated from gondwanian lineages which reached Europe by the end of the Cretaceous. North America was still connected with the northwest of Europe and the southern seas of Obi, in western Asia, still did not separate Europe from the ancient continental refuge of Angara. Toward the end of Cretaceous (?) (Montien; 65 million years), numerous lineages differentiated in Angara and spread over the Holarctic Region where they developed during Tertiary time.

Three of the Holarctic lineages are distinct which originated during the first half of Tertiary by formation of the "sillon transégén", connecting the Aralo-Caspian seas with the eastern Mediterranean so as to completely isolate the south from the remainder of Europe.

2.1 *Hercinian lineages.* Those originating in Asia, and which penetrated through the north of the "sillon transégén", became established in eastern Europe and as far as even the Appalachian region of North America.

2.2 *Tyrrhenian lineages.* Originating in Gondwana at the end of Cretaceous, these lineages became established at the mountainous regions of the Mediterranean.

2.3 *Aegean lineages.* These lineages penetrated Europe south of the "sillon transégén" and spread during the period of regression of the "Pontien" seas.

### Geographical Distribution of Neotropical Carabidae

The Neotropical carabid fauna is quite complex and has not been analysed as a whole. An analysis at the generic or even subtribal level would afford very interesting results as there is much endemism. Present lack of knowledge precludes such an analysis. Better ecological information is indispensable for the interpretation of certain details. Moreover, the survey of the fauna is only beginning, as indicated by many new findings such as the recent discovery of tribe Apotomini in the region. Little is known about the dynamics of many groups; brachyptery and aptery, as we know, are frequent in Carabidae. To the present these phenomena have been analysed in species of islands and mountains (Darlington, 1943, 1971), but little is known about those of continental areas.

For instance, what influence on the geographical interpretation of Hiletini would exert the notion that of the two Neotropical species of *Neohiletus*, adults of one (*batesi*) are apterous and adults of the other (*brasiliensis*) are winged? Adults of the Neotropical species of Helluonini with tarsomere 4 bilobed seem to prefer forests, while those with that tarsomere simply emarginate live in open areas (Reichardt, 1974: 217). What is the evolutionary significance of this fact?

An analysis at the level of tribe shows the following zoogeographic groups.

*Exclusively Neotropical tribes.* — These are five: Nototylini (monogeneric, the single species known from one specimen; relationships obscure); Catapiesini (two genera, 12 species); Cnemacanthini (one genus, 18 species); Euchelini (two genera, 13 species); and Agrini (one genus, 372 species). The last two tribes reach southeastern United States (Brownsville area of extreme southeastern Texas). Of these tribes, only Nototylini and Cnemacanthini are strictly South American; none have colonized the Antilles.

A group that might belong here is the Peleciini. However, peleciines seem to have relatives in Africa and are classified as Inabrazilian, although details of relationships between Neotropical and Ethiopian elements have yet to be determined.

*Australo-South American tribes.* — These are four: Migadopini; Zolini; Broscini; and Licinini. Broscines and licinines are represented elsewhere, too, but other geographical groups of them are derived from different stocks than those that gave rise to the Neotropical groups.

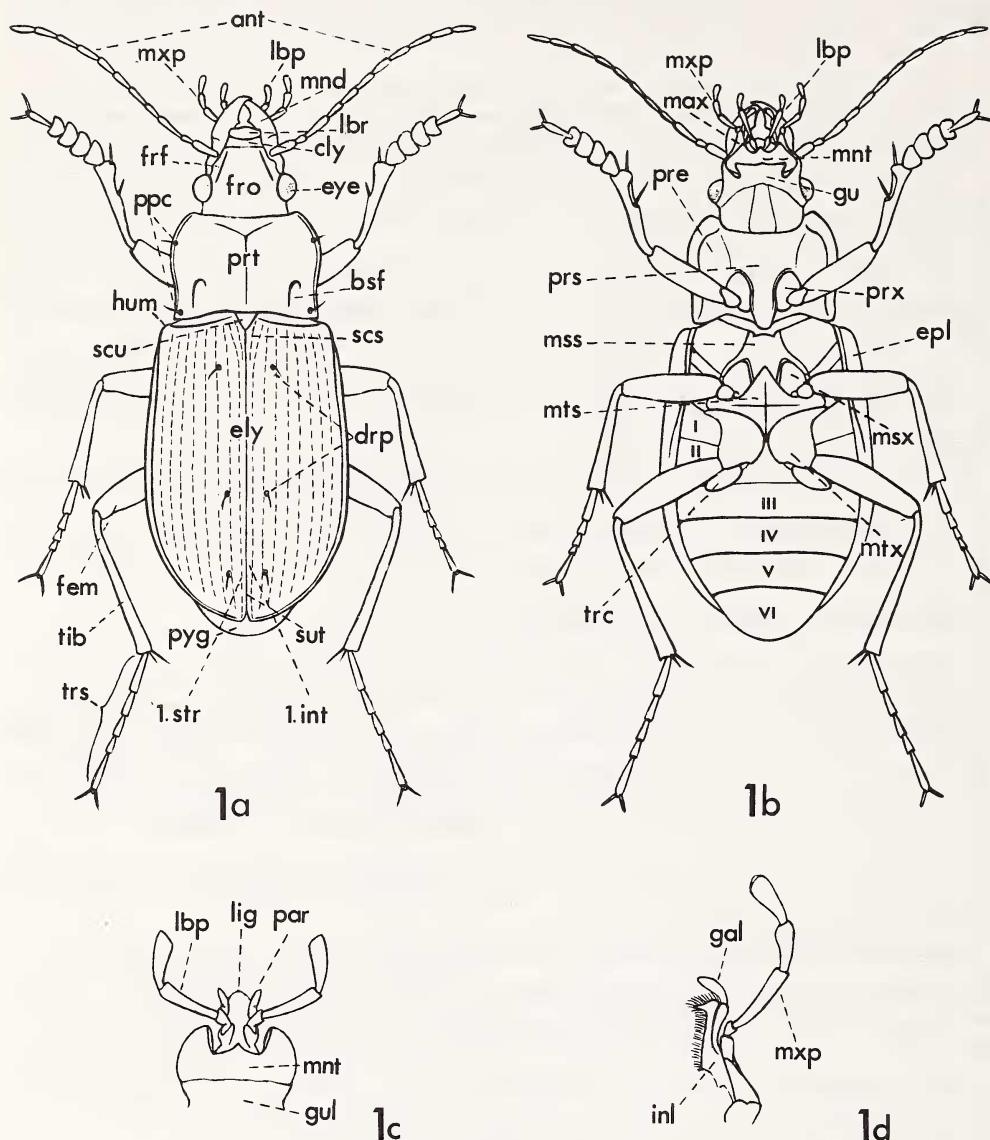


Fig. 1. Abbreviations.

ant — antenna  
 bsf — basal fovea of prothorax  
 cly — clypeus  
 drp — dorsal punctures of elytra  
 ely — elytra  
 epl — epipleura of elytra  
 eye — compound eye  
 fem — femur (thigh)  
 frf — frontal furrow  
 fro — frons  
 gal — galea (outer lobe of maxilla)  
 gu — gula (throat)  
 hum — humerus (shoulder)  
 inl — inner lobe of maxilla

lbp — labial palp  
 lbr — labrum (upper lip)  
 lig — ligula  
 max — maxilla (lower jaw)  
 mnd — mandible (upper jaw)  
 mnt — mentum (chin)  
 mss — mesosternum  
 msx — meso-coxa  
 mts — metasternum  
 mtx — meta-coxa  
 mxp — maxillary palp  
 par — paraglossae  
 ppe — setae of prothorax  
 pre — pro-episterna

prs — prosternum  
 prt — prothorax  
 prx — pro-coxa  
 pyg — pygidium (last tergite)  
 scs — scutellar stria  
 scu — scutellum  
 sut — suture of elytra  
 tib — tibia  
 trc — trochanter  
 trs — tarsus  
 l.int. — l. elytral interval  
 l.str. — l. elytral stria  
 I-VI — visible abdominal sternites

From Lindroth, C.H. 1969. Opusc. Ent., Supp. XXXV. Permission of author.

*Inabrazilian tribes.* — The following eight tribes are more or less confined to the tropical parts of Old and New Worlds, excluding the Australian tropics: Ctenostomatini; Hiletini; Cicindisini; Siagonini (including Enceladini); Apotomini; Lachnophorini; Peleciini (with Disphaericini included; otherwise, peleciines are restricted to the Neotropical Region); and Galeritini.

*Pan-tropical tribes.* — The following 10 tribes are represented in and more or less confined to the tropics of the Neotropical, Ethiopian, and Australian Regions: Megacephalini; Ozaenini; Paussini; Morionini; Perigonini; Ctenodactylini (Hexagoniini included); Dryptini; Zuphiini; Helluonini and Pseudomorphini.

*Tribes with Holarctic distribution.* — Some groups from temperate regions invaded the Nearctic areas of Mexico and Guatemala: Omophronini; Cychrini (not in the Neotropical Region); Notiophilini; Loricerini; and Amarini. These are clearly northern elements that either did not succeed in crossing the barrier into the lowland tropics, or are marginal there (Nearctic elements, Halffter, 1964). Some licinines also belong to this element, though the tribe has been listed above with "Australo-South American tribes". Licinines entered both boreal and tropical parts of Mexico. Only Omophronini (one species) and Licinini (two species) colonized the Antilles.

*Holarctic-South American pattern.* — This is exhibited by the Trachypachini (*Trachypachus* boreal - Holarctic, and *Systolsoma* confined to temperate southern South America).

*Tribes with world-wide distribution.* — This group includes 19 tribes: Cicindelini; Carabini; Scaritini; Rhysodini; Psydrini; Bembidiini; Pogonini; Trechini; Panagaeini; Pterostichini; Chlaeniini; Oodini; Harpalini; Masoreini; Lebiini; Pentagonalini; Odacanthini; Zuphiini; and Brachinini.

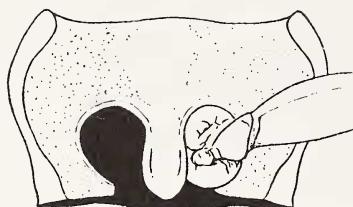
*The fauna of the Antilles.* — The meager fauna of the Greater Antilles was extensively sampled and studied by Darlington (1934, 1935a and b, 1937a and b, 1939, 1941, 1947, 1953, and 1970). The following tribes are recorded: Megacephalini: \*Cicindelini; Omophronini; Ozaenini; Carabini; \*Scaritini; \*Rhysodini; \*Bembidiini; Morionini; \*Pterostichini; Perigonini; Lachnophorini; \*Harpalini; Licinini; Panagaeini; Chlaeniini; Oodini; Odacanthini; Masoreini; Pentagonalini; \*Lebiini; Zuphiini; Galeritini; Brachinini; and Pseudomorphini. The tribes whose names are marked with an asterisk have more than a dozen species in the Antilles.

The tribes that invaded and survived in the Antilles are extensively distributed in the world, and are well represented in the Neotropical Region. Absence of Agrini, Eucheilini and Helluonini from that area is surprising.

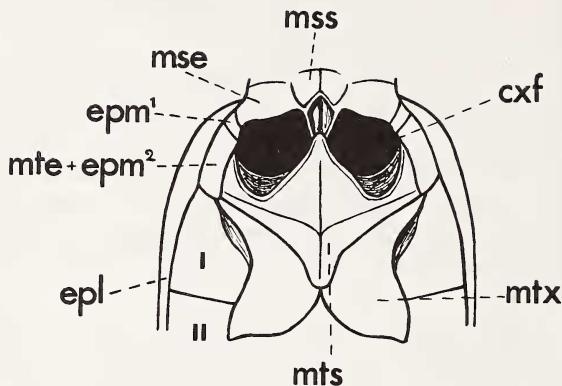
#### KEY TO ADULTS OF TRIBES OF CARABIDAE OF THE NEOTROPICAL REGION.<sup>1</sup>

1	Scutellum concealed by median lobe of posterior margin of pronotum. Intercoxal process of prosternum very broad, covering mesosternum. Body almost circular in outline .....	OMOPHRONINI, <i>Omophron</i> Latreille, p. 378
1'	Scutellum visible. Intercoxal process of prosternum not enlarged. Shape of body various .....	2
2 ( 1' )	Scape of antenna not evident from dorsal aspect. Head with short, deep antennal sulcus ventrally between eyes and mouthparts. Labium without suture between submentum and mentum .....	PSEUDOMORPHINI, <i>Pseudomorpha</i> Kirby, p. 452
2'	Antenna with scape visible from above. Head with or without short deep antennal sulcus .....	3

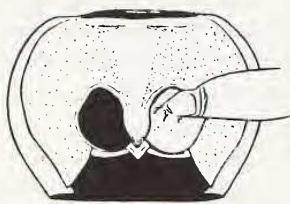
<sup>1</sup> [GEB]



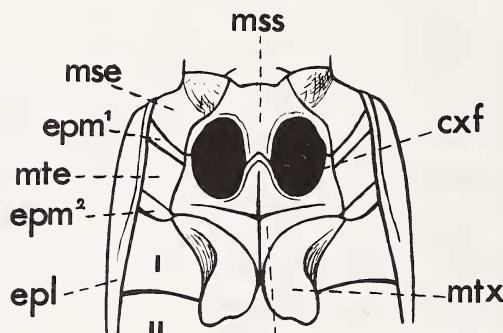
2a



3a



2b



3b

Fig. 2. Prothoraces, ventral aspect, with (a) fore coxal cavities "open", and (b) fore coxal cavities "closed". Fig. 3. Meso- and meta-thorax of (a) *Carabus*; (b) *Pterostichus*. Meso-coxae removed.

cxf — middle-coxal cavity

epl — epipleuron of elytra

epm<sup>1</sup> — epimeron of mesosternum

epm<sup>2</sup> — epimeron of metasternum

mse — mesepisternum

mss — mesosternum

mte — metepisternum

mts — metasternum

mtx — hind-coxa

I-II — first visible sternites

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- 3 ( 2') Abdomen with seven or eight sterna normally exposed. Mandible with at least one setigerous puncture in scrobe. Head with one pair of supraorbital setigerous punctures ..... BRACHININI, p. 452
- 3' Abdomen with six sterna normally exposed ..... 4
- 4 ( 3') Clypeus broader than distance between sockets of antennae (Fig. 5) .... CICINDELINAE ..... 5
- 4' Clypeus narrower than distance between antennal sockets ..... 7
- 5 ( 4 ) Metepisternum narrow, sulcate for entire length. Mesepisternum short. Lacinia of maxilla without articulated tooth ..... Ctenostomatini, *Ctenostoma* Klug, p. 371
- 5' Metepisternum plate-shaped, not entirely sulcate. Mesepisternum elongate. Lacinia with articulated tooth ..... 6
- 6 ( 5') Anterior angles of pronotum more advanced than anterior margin of prosternum. Anterior sulcus of pronotum separated or not from anterior sulcus of prosternum (as well as from prosternal - episternal sulcus). True ornamental pubescence absent. Terminal palpomere of maxillary palpus shorter or not than penultimate palpomere ..... MEGACEPHALINI, p. 372
- 6' Anterior angles of pronotum not more advanced than anterior margin of prosternum. Anterior sulcus continuous from pronotum to prosternum. True ornamental pubescence present in members of most taxa. Terminal article of maxillary palpus longer than penultimate article in members of most taxa ..... CICINDELINI, p. 372
- 7 ( 4') Metasternum without antecoxal suture, almost as long as combined length of abdominal sterna. Front tibia without apical spur (but with pair of prominent apical spines). Antenna moniliform. Head and pronotum deeply grooved ..... RHYSODINI, p. 392
- 7' Metasternum with antecoxal suture, and shorter in length. Front tibia with apical spur ..... 8
- 8 ( 7') Front tibia with two spurs terminal and ventral, independent of antenna cleaner (latter present or absent) ..... 9
- 8' Front tibia with one spur apical, one displaced distally, toward antenna cleaner ..... 13
- 9 ( 8 ) Tarsal claws unequal, anterior longer and stronger than posterior. Hind coxae contiguous. Elytron with base marginate to scutellum. Scutellar stria short ..... CICINDISINI, *Cicindis* Bruch, p. 375
- 9 ( 8 ) Tarsal claws unequal, anterior longer and stronger than posterior. Scutellar stria short ..... CICINDISINI, *Cicindis* Bruch, p. 375
- 9' Tarsal claws equal. Hind coxae separate. Base of elytron not marginated, or marginated only to lateral constriction ..... 10
- 10 ( 9 ) Hind coxa extended laterally to elytral epipleuron (Fig. 6) ..... TRACHYPACHINI, *Systolosoma* Solier, p. 375
- 10' Hind coxa normal, not in contact laterally with elytral epipleuron ..... 11
- 11 (10') Elytron without subapical fold at outer edge. Anterior tibia simple, without longitudinal sulcus or antenna cleaner ..... NOTOTYLINI, *Nototylus* Schaum, p. 375
- 11' Elytron with subapical fold at outer edge. Anterior tibia with antenna cleaner ..... PAUSSINAE ..... 12

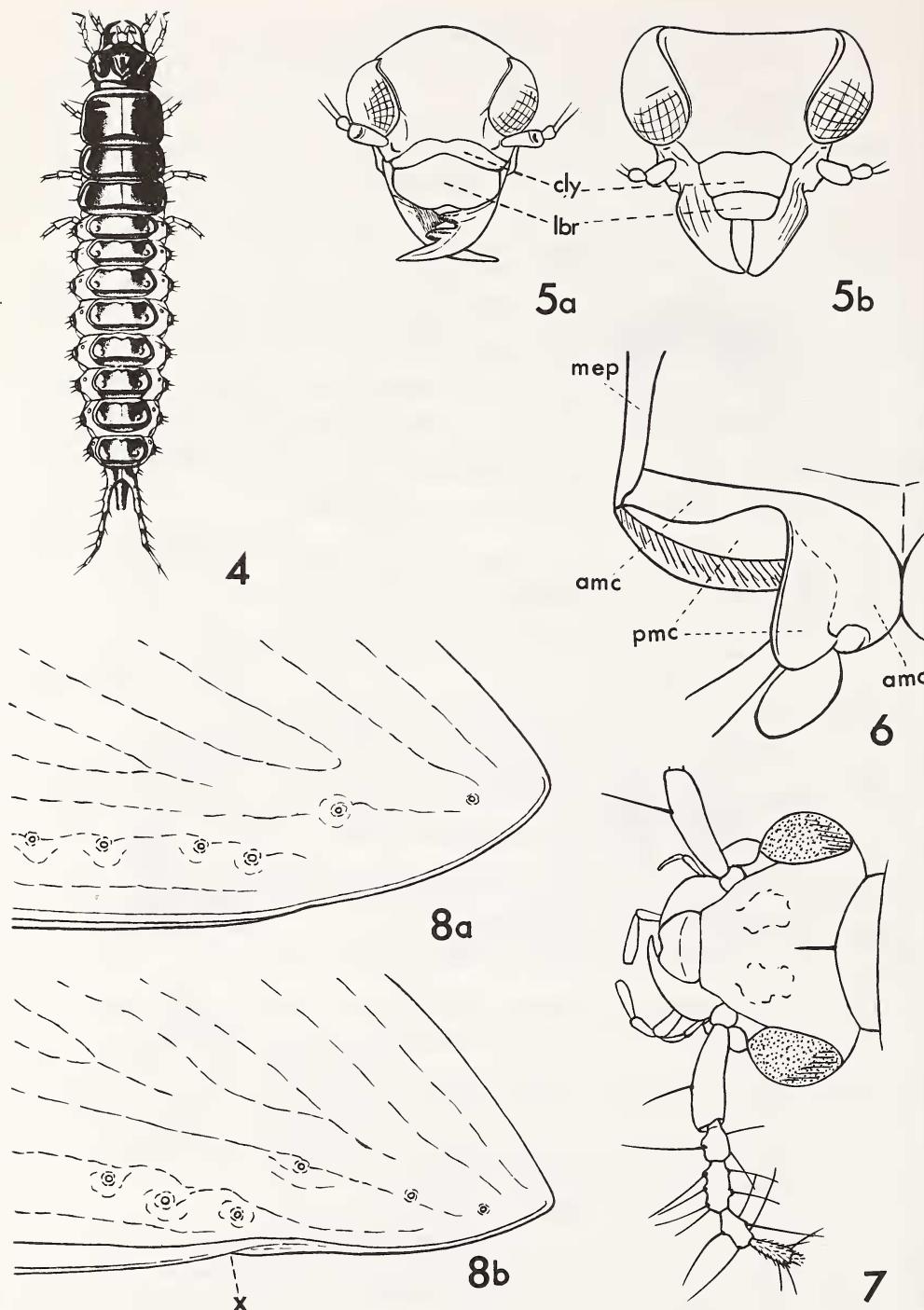


Fig. 4. Larva of *Agonum*, dorsal aspect, to illustrate typical form of carabid larvae. Fig. 5. Head of (a) *Cicindela*; (b) *Elaphrus*. cly – clypeus; lbr – labrum. Fig. 6. amc – anterior; pmc – posterior part of meta-coxa; mep – metepisterna. All specimens from Brit. Col. Fig. 7. Head of *Loricera pilicornis* L.. Setae drawn on antennae only. Fig. 8. Apices of elytra, with (a) epipleuron not interrupted (not crossed, simple), and (b) epipleuron interrupted (crossed) by the elytral plica (x). From Lindroth, C.H. 1961, 1966, and 1969. Opusc. Ent., Supp. XX, XXXIII, and XV. Permission of author.

- 12 (11') Antenna of 11 clearly visible articles, article 2 distinct, slightly shorter than article 3, articles 3 - 11 free, clearly separated and articulated. Anterior coxae not much projected, separated from each other by normal process ..... OZAENINI, p. 376
- 12' Antenna of 10 clearly visible articles, article 2 markedly reduced, indistinct. Anterior coxae prominent, contiguous, separated at base, or not, by narrow process ..... PAUSSINI, p. 376
- 13 (8') Anterior coxal cavities open posteriorly (Fig. 2a) ..... 14
- 13' Anterior coxal cavities closed posteriorly (Fig. 2b) ..... 17
- 14 (13) Head with two pairs of supraorbital setigerous punctures. Scape of antenna as long as antennomeres 2 - 6 together. Head with short, deep sulcus beneath, between eye and gular region. Mandibles spoon-shaped, each with several teeth ..... HILETINI, *Neohiletus* Jeannel, p. 384
- 14' Head with single pair of supraorbital setigerous punctures. (Fig. 1a, frf). Scape of antenna normal, less in length than length of antennomeres 2 - 6 together. Mandibles average ..... 15
- 15 (14') Frons with series of longitudinal costae. Middle coxal cavities conjunct (entirely enclosed by sterna, Fig. 3b). Head very broad. Eyes large. Body flat. Size small, length less than 7.0 mm ..... NOTIOPHILINI, *Notiophilus* Dumeril, p. 384
- 15' Frons without series of parallel carinae. Middle coxal cavities disjunct (not entirely enclosed by sterna (Fig. 3a)). Size large, length greater than 10.0 mm ..... 16
- 16 (15') Head very narrow (less than half as wide as pronotum at apex). Mandibles elongate, each with two sharp teeth near apex. Labrum long, deeply notched bilobed ..... [CYCHRINI, *Scaphinotus* Latreille, p. 384]
- 16' Head average. Mandibles of normal length, without large teeth near apex. Labrum of normal proportions, apical margin sinuate, but not deeply notched ..... CARABINI, p. 380
- 17 (13') Middle coxal cavities disjunct (not entirely enclosed by sterna, Fig. 3a) ..... 18
- 17' Middle coxal cavities conjunct (entirely enclosed by sterna Fig. 3b) ..... 21
- 18 (17) Antennomeres 2 - 6 with markedly large setae; antennomeres 2 - 4 irregular in shape (Fig. 7). Head with two large foveae and deep transverse sulcus behind eyes. Elytron with 12 regular striae ..... LORICERINI, *Loricera* Latreille, p. 384
- 18' Antennomeres 2 - 6 without markedly elongate setae. Combination of other characters not as above ..... 19
- 19 (18') Anterior tibia with both spurs nearly apical. Antenna cleaner sulcate, confined to posterior surface of tibia, not visible from anterior surface. Body pedunculate. Size large, length of body more than 30 mm (Frontispiece) ..... SIAGONINI, *Enceladus* Bonelli, p. 384
- 19' Anterior tibia with one spur markedly preapical, above groove of antenna cleaner, latter in form of notch in antero-lateral surface, visible anteriorly. Body pedunculate or not. Size various ..... 20
- 20 (19') Elytron with scutellar stria short (or absent). Body pedunculate ..... SCARITINI, p. 386
- 20' Elytron with scutellar stria extended to apex, parallel to elytral suture. Body not pedunculate (in form nebrioid, amaroid, pterostichoid, elongate or ovoid) ..... MIGADOPINI, p. 385

21	(17')	Scrobe of mandible with one or more setigerous punctures . . . . .	22
21'		Mandibular scrobe asetose . . . . .	29
22	(21)	Head with single pair of supraorbital setigerous punctures . . . . .	23
22'		Head with more than one pair of supraorbital setae . . . . .	24
23	(22)	Body pubescent. Size small, length of body less than 6.0 mm. Color rufous . . . . .	
		APOTOMINI, <i>Apotomus</i> Illiger, p. 394	
23'		Body glabrous except for usual fixed setae. Length more than 10.0 mm. Color various, black, coppery, green, but not rufous . . . . .	395
		BROSCINI (in part), p. . . . .	
24	(22')	Head with three or more pairs of supraorbital setigerous punctures. Dorsal surfaces of posterior tarsomeres glabrous. Size larger, length of body more than 10.0 mm . . . . .	BROSCINI (in part), p. 395
24'		Head with two pairs of supraorbital setae. Dorsal surfaces of posterior tarsomeres each with two or more setae. Size various . . . . .	25
25	(24')	Penultimate maxillary palpomere pubescent. Frontal grooves more widely separated at middle than at anterior part, and terminated before posterior margins of eyes. Anophthalmous specimens with penultimate maxillary palpomere very tumid . . . . .	26
25'		Penultimate maxillary palpomere glabrous . . . . .	28
26	(25)	Terminal maxillary palpomere much shorter and more slender than penultimate palpomere. Elytron with base margined. Tarsomeres with dorsal surfaces sulcate longitudinally, or not . . . . .	BEMBIDIINI, p. 396
26'		Terminal maxillary palpomere normal . . . . .	27
27	(26')	Elytron with plica posterior to epipleuron (Fig. 8b). Article 2 of antenna pubescent. Base of elytron margined or not. Each tarsomere with dorsal surface grooved longitudinally or not . . . . .	ZOLINI, p. 401
27'		Elytron with internal fold not interrupting lateral margin (Fig. 8a). Article 2 of antenna with tuft of setae, only. Base of elytron margined. Dorsal surface of each tarsomere smooth, without longitudinal groove . . . . .	POGONINI, p. 401
28	(25')	Elytron without internal plica behind epipleuron. Frontal grooves curved: at middle, distance between eye and adjacent groove subequal to distance between grooves, then expanded to genae and ventral side. Ligula with six or more setae. Male front tarsus with articles 1 - 2 expanded and with tooth apically at inner side . . . . .	TRECHINI, p. 401
28'		Elytron with internal plica. Frontal grooves at middle more distant from each other than from eyes; grooves not extended behind eyes. Ligula with two or three setae. Three or four basal articles of male front tarsus slightly and symmetrically expanded and rounded to apex (or simple) . . . . .	PSYDRINI, p. 394
29	(21')	Terminal maxillary palpomere articulated obliquely with penultimate palpomere. Integument markedly punctate. Head and pronotum either with pubescence thick and long, or completely glabrous, and surface brilliant, metallic. Elytron with well developed plica . . . . .	PANAGAEINI, p. 403
29'		Terminal and penultimate maxillary palpomeres articulated in straight line, at apex of penultimate palpomere. Integument punctate or not, setose or not. Elytron with or without plica . . . . .	30

- 30 (29') Head with more than two pairs of supraorbital setigerous punctures. Lateral edge of pronotum with several setae. Anterior tibia extended latero-apically as prominent, thick tooth-like projection ..... CNEMACANTHINI, *Cnemalobus* Guérin, p. 416
- 30' Head without, or with one or two pairs of supraorbital setigerous punctures. Number of pronotal setae various. Form of front tibia various ..... 31
- 31 (30') Head without or with one pair of supraorbital setigerous punctures ..... 32
- 31' Head with two pairs of supraorbital setigerous punctures ..... 39
- 32 (31) Elytron with apical margin truncate. Body glabrous and shining, depressed. Head without or with one pair of supraorbital setigerous punctures. Pronotum without or with one pair of setigerous punctures, at posterior angles ..... CATAPIESINI, p. 405
- 32' Elytron with apical margin not truncate. Body various. Head with one pair of supraorbital setigerous punctures. Pronotum with one or two pairs of setigerous punctures ..... 33
- 33 (32') Elytron without internal plica near apex (Fig. 8a) ..... 34
- 33' Elytron with internal plica (Fig. 8b) ..... 37
- 34 (33) Antennomere 3 with few setae only, not pubescent; antennomere 4 pubescent in apical 0.33 ..... 35
- 34' Antennomere 3 pubescent in apical 0.33, antennomere 4 pubescent throughout ..... 36
- 35 (33) Body rotund, elytra vaulted. Elytron with deep striae. Mandibles and maxillae elongate. Mentum of labium shallowly bisinuate, with short tooth ..... PTEROSTICHINI, *Cyrtolaus* Bates, p. 405
- 35' Body average, elytra normal. Striae of elytra average. Mouthparts not as above ..... PTEROSTICHINI, *Agonina* (part), p. 405
- 36 (34') Terminal maxillary palpomere elongate, more than twice length of penultimate palpomere. Terminal labial palpomere glabrous, not elongate. Antennomeres of flagellum quadrate ..... PTEROSTICHINI, *Cratocerus* Dejean, p. 405
- 36' Terminal maxillary and labial palpomeres similar in size and proportions. Antennomeres of flagellum slender, elongate, antenna filiform ..... HARPALINI, p. 421
- 37 (35') Surface of elytra and pronotum finely and densely punctate, with fine pubescence. Scutellar stria normal ..... CHLAENIINI, p. 417
- 37' Dorsal surface not densely punctate, without fine pubescence. Scutellar stria short or absent ..... 38
- 38 (37') Elytron with interval 9 almost absent; stria 8 in form of deep, rugose groove, especially from middle onward; scutellar stria short; epipleuron gradually tapered to apex. Palpus (maxillary or labial) with terminal article normal ..... OODINI, p. 417
- 38' Elytron with interval 9 normal, wider or narrower; stria 8 normal, similar to others; scutellar stria absent; epipleuron expanded near mesothoracic region, then tapered gradually posteriorly ..... PELECHINI, *Peleciun* Kirby, p. 429
- 39 (31') Antennomeres 5 - 10 submoniliform, short or slightly depressed. Margin of pronotum with approximately seven pairs of setae. Stria 8 in form of zigzag sulcus, with numerous scattered setigerous punctures. Body subpenunculate. Legs flattened ..... MORIONINI, p. 404

39'	Antennomeres 5 - 10 slender, antenna distinctly filiform; or submoniliform and pronotum with single pair of lateral setae; and/or other character states different from above . . . . .	40
40 (39')	Elytron with internal plica . . . . .	41
40'	Elytron without internal plica . . . . .	42
41 (40)	Penultimate labial palpomere plurisetose . . . . .	
	AMARINI, <i>Amara</i> Bonelli, p. 415	
41'	Penultimate labial palpomere bisetose . . . . .	405
42 (40')	Pronotum narrow, distinctly longer than wide, at apex as wide as posterior part of head . . . . .	43
42'	Pronotum not distinctly longer than wide, and/or wider at apex than posterior part of head . . . . .	46
43 (42)	Terminal maxillary and/or labial palpomere trianguloid. Tarsomere 4 notched, bilobed . . . . .	44
43'	Terminal maxillary and labial palpomeres cylindrical, normal. Tarsomere 4 bilobed or entire . . . . .	45
44 (43)	Terminal labial palpomere trianguloid. Antenna with scape and antennomere 3 of about same length. Tarsal claws pectinate . . . . .	
	AGRINI, <i>Agra</i> Fabricius, p. 431	
44'	Terminal maxillary and labial palpomeres trianguloid. Scape of antenna very large, longer than antennomere 3. Tarsal claws smooth . . . . .	
	DRYPTINI, <i>Neodrypta</i> Basilewsky, p. 447	
45 (43')	Tarsomere 4 deeply notched at apex, bilobed, lobes more than 0.5 length of tarsomere 5. Elytra entire, abdominal terga completely covered . . . . .	
	CTENODACTYLINI, p. 435	
45'	Tarsomere 4 simple or only slightly emarginate apically. Elytron with apex truncate . . . . .	
	ODACANTHINI, p. 432	
45 (42')	Posterior tibia with inner spur more than 0.5 length of hind basitarsus, inner spur longer than outer spur. Tarsal claws pectinate or not . . . . .	47
46'	Posterior tibia with spurs more or less equal and shorter than 0.5 length of hind basitarsus . . . . .	48
47 (46)	Labrum elongate, length more than 0.5 width at base. Head markedly constricted posteriorly, in form of neck. Pronotum widest at base, narrowed anteriorly . . . . .	
	LEBIINI, <i>Nemotarsus</i> LeConte, p. 437	
47'	Labrum average, length less than 0.5 width at base. Head not constricted posteriorly in form of neck. Pronotum either widest anteriorly, with sides slightly sinuate before base, or base and apex about equal, and sides rounded . . . . .	
	MASOREINI, p. 429	
48 (46')	Head with one pair of setae ventrally, posterior to submentum. Labrum elongate . . . . .	
	LEBIINI, <i>Pericalina</i> , p. 437	
48'	Head without pair of setae posterior to submentum . . . . .	49
49 (48')	Elytron with apical margin truncate . . . . .	50
49'	Elytron with apical margin entire, sinuate or not . . . . .	56
50 (49)	Tarsal claws pectinate . . . . .	51
50'	Tarsal claws simple . . . . .	52
51 (50)	Labrum large, apices of mandibles covered . . . . .	
	EUCHEILINI, <i>Eucheila</i> Dejean, p. 451	
51'	Labrum normal, apices of mandibles exposed . . . . .	
	LEBIINI (part), p. 437	

- 52 (50') Dorsal surface glabrous, except for normal fixed setae. Antennomeres 1 - 3 glabrous, except one long seta on scape, and ring of setae near apex of antennomeres 2 and 3 ..... 53
- 52' Dorsal surface finely pubescent. Articles 1 - 3 of antenna pubescent ..... 54
- 53 (52) Head not constricted posteriorly. Ligula large. General aspect of pronotum hexagonal, as wide as long, with margin crenulated, and two pairs of setae ..... EUCHEILINI, *Inna* Putzeys, p. 451
- 53' Head markedly constricted posteriorly. Ligula normal. General aspect of pronotum pentagonal, margins smooth with single pair of setae located anteriorly ..... PENTAGONICINI, *Pentagonica* Schmidt-Goebel, p. 431
- 54 (52') Scape of antenna longer than combined lengths of antennomeres 2 plus 3. Size small, length of body about 6.0 mm, or less .. ZUPHIINI, p. 448
- 54' Antennal scape shorter than combined lengths of antennomeres 2 plus 3. Size larger, length of body 10.0 mm or more ..... 55
- 55 (54') Antennomeres 5 - 11 more or less flattened, finely pubescent, central area on each side of article generally triangular and more or less glabrous ..... HELLUONINI, p. 449
- 55' Antennomeres 5 - 11 not flattened, uniformly pubescent ..... GALERITINI, p. 447
- 56 (49') Clypeus sloped downward, surface more or less concave, emarginate anteriorly. Labrum deeply notched ..... LICININI, p. 420
- 56' Clypeus plane, not sloped, anterior margin straight or slightly emarginate. Labrum with anterior margin truncate or slightly concave ..... 57
- 57 (56') Elytron with stria 8 impressed and obliquely extended almost to apical sutural angle. Posterior trochanter almost 0.5 length of posterior femur ..... PERIGONINI, p. 415
- 57' Stria 8 normal ..... 58
- 58 (57') Dorsal surface glabrous except for some scattered setae ..... 35
- 58' Dorsal surface more or less pubescent ..... 59
- 59 (58') Elytron with odd-numbered intervals setose ..... PTEROSTICHINI, *Agonina* (part), p. 405
- 59' All elytral intervals setose ..... 60
- 60 (59') Elytral striae more deeply impressed on anterior half; and/or anterior half of striae coarsely punctate and posterior half finely punctate or impunctate. Setae erect and at least a few longer, as on scape ..... LACHNOPHORINI, p. 413
- 60' Elytron with striae equally punctate, impressed or not. Body with short, dense, and decumbant pubescence ..... PTEROSTICHINI, *Agonina* (part), p. 405

## CHAVE PARA ADULTOS DAS TRIBOS NEOTROPICAIS DE CARABIDAE

- 1 Escutelo oculto pelo lobo médio da margem posterior do pronoto. Processo intercoxal do prosterno muito largo, encobre o mesosterno. Corpo com aspecto geral mais ou menos circular ..... OMOPHRONINI, *Omophron* Latreille, p. 378
- 1' Escutelo visivel. Processo intercoxal do prosterno não alargado. Forma geral do corpo variável ..... 2

2 ( 1' )	Escapo invisivel de cima. Lábio sem sutura entre submento e mento. Cabeca com sulco antenal curto e profundo na parte inferior, entre os olhos e as pecas bucais . . . . .	PSEUDOMORPHINI, <i>Pseudomorpha</i> Kirby, p. 452
2'	Escapo visivel de cima. Cabeca com ou sem sulcos antenais curtos e profundos . . . . .	3
3 ( 2' )	Abdômen com sete ou oito esternitos expostos. Mandibulas com, pelo menos, um ponto pilifero no escrobo. Cabeca com um par de cerdas supra-orbitais . . . . .	BRACHININI, p. 452
3'	Abdômen com seis esternitos visiveis . . . . .	4
4 ( 3' )	Clípeo mais largo que a distância entre as inserções das antenas (Fig. 5) . . . . .	CICINDELINAE . . . . .
4'	Clípeo mais estreito que a distância entre as inserções das antenas . . . . .	5
5 ( 4 )	Metepisternos estreitos, sulcados em toda extensão. Mesepisternos alongados. Lacinia sem dente articulado . . . . .	CTENOSTOMATINI, <i>Ctenostoma</i> Klug, p. 371
5'	Metepisternos em forma de placa, nunca inteiramente sulcados. Mesepisternos curtos. Lacinia com dente articulado . . . . .	6
6 ( 5' )	Ângulos anteriores do pronoto mais projetados do que a margem anterior do prosterno. Sulco anterior do pronoto separado ou não do sulco anterior do prosterno (assim como do sulco prosterno-episterno). Pilosidade ornamental verdadeira ausente. Último segmento dos palpos maxilares mais curto ou não que o penúltimo . . . . .	MEGACEPHALINI, p. 372
6'	Ângulos anteriores do pronoto não ultrapassam a margem anterior do prosterno. Sulco anterior continuo do pronoto ao prosterno. Pilosidade ornamental verdadeira em geral presente. Último segmento dos palpos maxilares mais longo que o penúltimo na maioria dos taxa . . . . .	CICINDELINI, p. 372
7 ( 4' )	Metasterno sem sutura antecoxal, quase tão longo quanto os esternitos abdominais reunidos. Tibias anteriores em esporão apical (mas com um par de espinhos apicais proeminentes). Antenas moniliformes. Cabeca e pronoto profundamente sulcados . . . . .	RHYSODINI, p. 392
7'	Metasterno curto, com sutura antecoxal. Tibias anteriores com esporão apical . . . . .	8
8 ( 7' )	Tibias anteriores com dois esporões, terminal e ventral, independentes do “órgão de toilette” (que pode faltar) . . . . .	9
8'	Tibias anteriores com dois esporões desiguais, o externo na face ventral ou mesmo na borda interna, faz parte do “órgão de toilette” . . . . .	13
9 ( 8 )	Garras tarsais desiguais, a anterior mais longa e mais forte que a posterior. Coxas posteriores contiguas. Base dos élitros marginada até o escutelo. Estria escutelar curta . . . . .	CICINDISINI, <i>Cicindis</i> Bruch, p. 375
9'	Garras tarsais iguais. Coxas posteriores separadas. Base dos élitros não marginada ou marginada apenas até a constricção lateral . . . . .	10
10 ( 9 )	Coxas posteriores projetadas lateralmente até as epipleuras . . . . .	TRACHYPACHIDINI, <i>Systolosoma</i> Solier, p. 375
10'	Coxas posteriores normais, não atingem as epipleuras . . . . .	11
11 ( 10 )	Élitros sem pequena dobra saliente no quinto apical da margem. Tibias anteriores simples, sem sulco longitudinal ou “órgão de toilette” . . . . .	NOTOTYLINI, <i>Nototylus</i> Schaum, p. 375

11'	Élitros com pequena dobra saliente no quinto apical da margem. Tibias anteriores com “órgão de toilette” . . . . .	PAUSSINAE	12
12 (11')	Antenas com onze segmentos, claramente visíveis, o segundo distinto, pouco mais curto que o terceiro; articulos III-XI livres, nitidamente separados e articulados. Coxas anteriores pouco salientes, separadas pelo processo prosternal . . . . .	OZAENINI, p.	376
12'	Antenas com dez segmentos, o segundo sempre atrofiado, indistinto. Coxas anteriores salientes, contíguas na base, separadas ou não por processo estreito . . . . .	PAUSSINI, p.	376
13 (8')	Cavidades coxais anteriores abertas atrás (Fig. 2a) . . . . .		14
13'	Cavidades coxais anteriores fechadas atrás (Fig. 2b). . . . .		17
14 (13)	Dois pares de cerdas supra orbitais. Escapo tão longo quanto a soma dos segmentos II-VI. Parte inferior da cabeca com sulco curto e profundo entre os olhos e a região gular. Mandibulas em forma de colher, cada uma com vários dentes . . . . .	HILETINI, p.	384
14'	Um par de cerdas supra orbitais. Escapo normal, menor os que segmentos II-VI reunidos. Mandibulas normais . . . . .		15
15 (14')	Fronte com série de pequenas carenas longitudinais. Cavidades coxais médias contíguas (completamente fechadas pelo esterno). Cabeca muito larga. Olhos grandes. Corpo achatado. Pequenas dimensões, comprimento menor que 7.0 mm . . . . .	NOTIOPHILINI, <i>Notiophilus</i> Dumeril, p.	384
15'	Fronte sem série de carenas paralelas. Cavidades coxais médias separadas (parcialmente fechadas pelo esterno). Dimensões maiores, comprimento acima de 10.0 mm . . . . .		16
16 (15')	Cabeca muito estreita (menos da metade da largura do ápice do pronoto). Mandibulas alongadas, cada uma com dois dentes agudos perto do ápice. Labro longo, profundamente entalhado e bilobado . . . . .	[CYCHRINI, <i>Scaphinotus</i> Latreille, p.	384]
16'	Cabeca normal. Mandibulas de comprimento normal, sem dentes grandes perto do ápice. Labro normal com margem apical sinuosa, mas não profundamente entalhada . . . . .	CARABINI, p.	380
17 (13')	Cavidades coxais médias separadas (não totalmente fechadas pelo esterno, Fig. 3a) . . . . .		18
17'	Cavidades coxais médias contíguas (totalmente fechadas pelo esterno, (Fig. 3b) . . . . .		21
18 (17)	Segmentos II-VI das antenas com cerdas notavelmente grandes; segmentos II-IV com forma irregular (Fig. 7). Cabeca com duas fóveas grandes e um sulco transversal profundo atrás dos olhos. Élitros com doze estrias regulares . . . . .	LORICERINI, <i>Loricera</i> Latreille, p.	384
18'	Segmentos II-VI das antenas; sem cerdas notavelmente grandes. Outra combinacao de caracteres . . . . .		19.
19 (18')	Tibias anteriores com ambos os esporões localizados perto do ápice. “Órgão de toilette” situado na margem posterior da tibia, invisível pela face anterior. Corpo pedunculado. Dimensões avantajadas, maiores de 30.0 mm . . . . .	SIAGONINI, <i>Enceladus</i> Bonelli, p.	384
19'	Tibias anteriores com um esporão pré-apical situado acima do “órgão de toilette” e visível na face anterior. Corpo pedunculado ou não. Dimensões variáveis . . . . .		20

- 20 (19') Élitros com estrias escutelares curtas (ou ausentes). Corpo pedunculado ..... SCARITINI, p. 386
- 20' Élitros com estrias escutelares prolongadas até os ápices, paralelas à sutura elital. Corpo não pedunculado (formas: nebríode, amaróide, pterostichóide, alongada ou ovóide) ..... MIGAPODINI, p. 385
- 21 (17') Mandíbulas com uma ou mais cerdas no escrobo ..... 22
- 21' Mandíbulas sem cerdas no escrobo ..... 29
- 22 (21) Cabeça com único par de cerdas supra-orbitais ..... 23
- 22' Cabeça com mais de um par de cerdas supra-orbitais ..... 24
- 23 (22) Corpo pubescente. Pequenas dimensões (comprimento menor que 6.0 mm). Coloração avermelhada ..... APOTOMINI, *Apotomus* Illiger, p. 394
- 23' Corpo glabro, exceto pelas cerdas habituais. Comprimento maior que 10.0 mm. Coloração variável (preta, acobreada ou esverdeada, mas nunca avermelhada) ..... BROSCINI (parte), p. 395
- 24 (22') Cabeça com três ou mais pares de cerdas supra-orbitais. Superfície dorsal dos tarsômeros posteriores com duas ou mais cerdas. Tamanho grande, maiores que 10.0 mm ..... BROSCINI (parte), p. 395
- 24' Cabeça com dois pares de cerdas supra-orbitais. Superfície dorsal dos tarsômeros posteriores com duas ou mais cerdas. Tamanho variável ..... 25
- 25 (24') Penúltimo segmento dos palpos maxilares pubescente. Sulcos frontais mais separados no meio do que na parte anterior, terminam antes da margem posterior dos olhos. Espécimens anoftalmos com o penúltimo segmento dos palpos maxilares muito entumescido ..... 26
- 25' Penúltimo segmento dos palpos maxilares glabro ..... 28
- 26 (25) Último segmento dos palpos maxilares muito menor e mais fino que o penúltimo. Élitros marginados na base. Face dorsal dos tarsômeros longitudinalmente sulcada ou não ..... BEMBIDIINI, p. 396
- 26' Último segmento dos palpos maxilares normal ..... 27
- 27 (26') Élito com dobra posterior à epipleura (Fig. 8b). Segundo segmento antenal pubescente. Base dos élitros marginada ou não. Face dorsal dos tarsômeros longitudinalmente sulcada ou não ..... ZOLINI, p. 401
- 27' A dobra interna do élito não interrompe a margem. Segundo segmento antenal com tufo de cerdas. Base do élito marginada. Parte dorsal dos tarsômeros lisa, sem sulco longitudinal ..... POGONINI, p. 401
- 28 (25') Élitros sem dobra interna atrás da epipleura. Sulcos frontais curvos; no meio a distância entre o olho e o sulco adjacente é subigual à distância entre sulcos; estes expandem-se para as genas e parte ventral. Ligula com seis ou mais cerdas. Os dois segmentos tarsais anteriores dos machos alargados e com dente apical no lado interno ..... TRECHINI, p. 401
- 28' Élitros com dobra interna. Sulcos da fronte, no meio muito mais separados entre si do que dos olhos; sulcos não prolonga dos para trás dos olhos. Ligula com duas ou três cerdas. Três ou quatro segmentos basais dos tarsos anteriores dos machos pouco e simetricamente expandidos e arredondados no ápice (ou simples) ..... PSYDRINI, p. 394
- 29 (21') Último articulo dos palpos maxilares obliquamente articulado ao anterior. Tegumento fortemente pontuado. Cabeça e pronoto com pubescência grosseira e longa ou completamente glabros, brilhantes e de cor metálica. Élitros com dobra interna bem desenvolvida ..... PANAGAEINI, p. 403

- 29' Último articulo dos palpos maxilares articulado ao penúltimo em linha reta. Tegumento pontuado ou não, piloso ou não. Élitro com ou sem dobra interna ..... 30
- 30 (29') Cabeca com mais de dois pares de cerdas supra-orbitais. Margem lateral do pronoto com várias cerdas. Tibias anteriores projetadas no lado externo em forte dente ..... CNEMACANTHINI, *Cnemalobus* Guérin, p. 416
- 30' Cabeca sem, com um ou dois pares de cerdas supra-orbitais. Pronoto com número variável de cerdas. Tibias anteriores com várias formas ..... 31
- 31 (30') Cabeca sem ou com um par de cerdas supra-orbitais ..... 32
- 31' Cabeca com dois pares de cerdas supra-orbitais ..... 39
- 32 (31) Ápice dos élitros truncado. Corpo glabro, brilhante e deprimido. Nenhum ou um par de cerdas supra-orbitais. Pronoto sem ou com um par de cerdas no ângulo posterior ..... CATAPIESINI, p. 405
- 32' Ápice dos élitros não truncado. Sempre com um par de cerdas supra-orbitais. Pronoto com um ou dois pares de cerdas ..... 33
- 33 (32') Margem elital sem dobra interna próxima ao ápice ..... 34
- 33' Margem elital com dobra interna ..... 37
- 34 (33) Articulo III das antenas com apenas algumas cerdas, não pubescente; articulo IV pubescente no terco apical ..... 35
- 34 Articulo III das antenas pubescente no terco apical; articulo IV inteiramente pubescente ..... 36
- 35 (33) Corpo arredondado, élitros convexos, profundamente estriados. Mandibulas e maxilas alongadas. Mento ligeiramente bissinuado, com dente curto ..... PTEROSTICHINI, *Cyrtolaus* Bates, p. 405
- 35' Corpo, élitros e estrias normais. Pecas bucais diferentes ..... PTEROSTICHINI, Agonina (part), p. 405
- 36 (34') Palpos maxilares com articulo terminal alongado, duas vezes mais longo que o penúltimo. Palpo labial com articulo terminal glabro, não alongado. Flagelo antenal com segmentos quadrangulares ..... PTEROSTICHINI, *Cratocerus* Dejean, p. 405
- 36' Últimos segmentos dos palpos maxilares e labiais semelhantes em tamanho e proporções. Flagelo antenal com segmentos alongados; antenas filiformes ..... HARPALINI, p. 421
- 37 (35') Superficie dos élitros e do pronoto fina e densamente pontuada, coberta de fina pubescência. Estria escutelar normal ..... CHLAENIINI, p. 417
- 37' Pronoto e élitros não densamente pontuados, sem pubescência. Estria escutelar curta ou ausente ..... 38
- 38 (37') Nono intersticio elital praticamente ausente; oitava estria formando sulco profundo e rugoso, especialmente a partir do meio. Estria escutelar curta. Epipleuras gradualmente estreitadas da base ao ápice. Último articulo dos palpos maxilar e labial normal ..... OODINI, p. 417
- 38' Nono intersticio elital normal, mais largo ou mais estreito; oitava estria tambem normal, igual às outras. Estria escutelar ausente. Último articulo dos palpos muito alargado em direção ao ápice. Epipleuras expandidas perto da região do mesosterno, gradualmente estreitadas dai para trás ..... PELECHINI, *Pelecinus* Kirby, p. 429
- 39 (31') Articulos antenais V-X sub-moniliformes, curtos ou levemente comprimidos. Margem do pronoto com cerca de sete pares de cerdas. Oitava estria em zigue-zague, com numerosas pontuações setigeras espacadas. Corpo subpenduludo. Pernas achataadas ..... MORIONINI, p. 404

39'	Articulos antenais V-X finos, distintamente filiformes; quando submoniliformes, ou pronoto com apenas um par de cerdas a cada lado e/ou demais caracteres diferentes . . . . .	40
40 (39')	Élitros com dobra interna . . . . .	41
40'	Élitros sem dobra interna . . . . .	42
41 (40 )	Penúltimo segmento do palpo labial plurisetoso . . . . .	
	AMARINI, <i>Amara</i> Bonelli, p. 415	
41'	Penúltimo segmento do palpo labial bisetoso . . . . .	
	PTEROSTICHINI (parte), p. 405	
42 (40')	Pronoto estreito, distintamente mais longo que largo no ápice tão largo quanto a porção posterior da cabeca . . . . .	43
42'	Pronoto não distintamente mais longo que largo e/ou mais largo no ápice do que na porção posterior da cabeca . . . . .	46
43 (42 )	Último articulo dos palpos labiais e maxilares (ou apenas dos labiais) triangular. Quarto segmento tarsal profundamente entalhado . . . . .	44
43'	Último articulo dos palpos cilindrico, normal. Quarto segmento tarsal bilobado ou inteiro . . . . .	45
44 (43 )	Último articulo dos palpos labiais triangular. Escapo sub-igual em comprimento ao terceiro segmento. Garras tarsais pectinadas . . . . .	
	AGRINI, <i>Agra</i> Fabricius, p. 431	
44'	Último articulo dos palpos maxilares e labiais triangular. Escapo muito longo, mais comprido que o terceiro segmento. Garras tarsais simples . . . . .	
	DRYPTINI, <i>Neodrypta</i> Basilewsky, p. 447	
45 (43')	Quarto tarsômero profundamente bilobado, os lobos com mais da metade do comprimento do quinto segmento. Élitros inteiros, cobrem completamente o abdômen . . . . .	435
45'	Quarto tarsômero simples ou ligeiramente emarginado. Élitros truncados nos ápices . . . . .	ODACANTHINI, p. 432
46 (42')	Esporão interno da tibia posterior muito mais longo que o externo, às vezes com mais da metade do comprimento do basitarso. Garras tarsais pectinadas ou não . . . . .	47
46'	Esporões da tibia posterior subiguais, com menos da metade do comprimento do basitarso posterior . . . . .	48
47 (46 )	Labro alongado, com comprimento maior que metade da largura basal. Cabeca distintamente constricta posteriormente em forma de pescoco. Pronoto alargado na base e estreitado anteriormente . . . . .	
	LEBIINI, <i>Nemotarsus</i> LeConte, p. 437	
47'	Labro normal com comprimento menor que metade da largura da base. Cabeca não constricta posteriormente em forma de pescoco. Pronoto mais largo anteriormente com lados ligeiramente sinuosos antes da base ou base e ápice aproximadamente iguais com lados arredondados . . . . .	
	MASOREINI, p. 429	
48 (46')	Cabeca com um par de cerdas ventrais, posteriores ao submento. Labro alongado . . . . .	
	LEBIINI, <i>Pericalina</i> , p. 437	
48'	Cabeca sem par de cerdas atrás do submento . . . . .	49
49 (48')	Élitros truncados no ápice . . . . .	50
49'	Élitros com ápices inteiros, sinuosos ou não . . . . .	56
50 (49 )	Garras tarsais pectinadas . . . . .	51
50'	Garras tarsais simples . . . . .	52

- 51 (50) Labro grande, cobre o ápice das mandíbulas ..... EUCHEILINI, *Eucheila* Dejean, p. 451
- 51' Labro normal, ápices das mandíbulas expostos ..... LEBIINI (parte), p. 437
- 52 (50') Face dorsal glabra, exceto algumas cerdas esparsas. Articullos antenais I-III glabros, exceto uma cerda longa no escapo e um anel de cerdas próximo ao ápice do segundo e terceiro segmento ..... 53
- 52' Face dorsal finamente pubescente. Articullos antenais I-III pubescentes ..... 54
- 53 (52) Cabeça não estrangulada atrás. Labro grande, cobre o ápice das mandíbulas. Pronoto com aspecto geral hexagonal, tão largo quanto longo, com margens serrilhadas e com dois pares de cerdas ..... EUCHEILINI, *Inna* Putzeys, p. 451
- 53' Cabeça fortemente estrangulada atrás. Labro normal. Pronoto de aspecto pentagonal, mais largo que longo, com margens lisas e apenas um par anterior de cerdas ..... PENTAGONICINI, *Pentagonica* Schmidt-Goebel, p. 431
- 54 (52') Escapo mais longo que os segmentos II-III em conjunto. Pequenas dimensões (comprimento 6.0 mm, ou menos) ..... ZUPHIINI, p. 448
- 54' Escapo mais curto que os segmentos II-III em conjunto, dimensões maiores (comprimento 10.0 mm ou mais) ..... 55
- 55 (54') Segmentos antenais V-XI mais ou menos achatados, finamente pubescentes e com área central glabra, em geral triangular ..... HELLUONINI, p. 449
- 55' Segmentos antenais V-XI não achatados e uniformemente pubescentes ..... GALERITINI, p. 447
- 56 (49') Clípeo em declive, emarginado anteriormente, com superfície mais ou menos côncava. Labro profundamente emarginado ..... LICININI, p. 420
- 56' Clípeo plano, não em declive, com margem anterior reta ou levemente entalhada. Margem anterior do labro truncada ou ligeiramente côncava ..... 57
- 57 (56') Oitava estria impressa e expandida obliquamente até quase o ângulo apical externo. Trocânter posterior com quase metade do comprimento do respectivo fêmur ..... PERIGONINI, p. 415
- 57' Oitava estria elital normal ..... 58
- 58 (57') Face dorsal glabra, exceto algumas cerdas esparsas ..... 35
- 58' Face dorsal mais ou menos pubescente ..... 59
- 59 (58') Apenas os interstícios ímpares dos élitros com cerdas ..... PTEROSTICHINI, *Agonina* (parte), p. 405
- 59' Todos interstícios elitrais com cerdas ..... 60
- 60 (59') Estrias elitrais mais impressas na metade anterior e/ou metade anterior das estrias grosseiramente pontuada e metade posterior finamente pontuada ou lisa. Cerdas eretas e, pelo menos algumas, tão longas quanto o escapo ..... LACHNOPHORINI, p. 413
- 60' Estrias elitrais uniformemente pontuadas, impressas ou lisas. Pubescência corporal mais curta, decumbente e densa ..... PTEROSTICHINI, *Agonia* (parte), p. 405

## DIVISION ISOCHAETA

In his first major reclassification of the Carabidae, Jeannel (1941) arranged the species in two major groups: the Isochaeta — adults with two terminal spurs on front tibia; and Aniso-chaeta — adults with only one spur apically, the other displaced toward the antenna cleaner.

The Isochaeta includes only a few groups of Carabidae, mostly relicts, while the Aniso-chaeta includes most of the family. Jeannel (1941 and 1946) did not consider the Cicindelinae among the Isochaeta, but Lindroth (1969b: xvii) considered tiger-beetles as "isochaetous", and I accept this.

Relationships of the groups included in Isochaeta are not well established, and they have usually been given subfamilial rank. Only one of the subfamilies, the Metriinae (a monogeneric subfamily restricted to western North America - see Lindroth, 1961: 6) does not occur in the Neotropical Region.

#### Subfamily Cicindelinae

The systematic position of the Cicindelinae among the family Carabidae has been very much discussed. In spite of some exceptions, as Mandl (1971: 507-508) who suggests returning the group to the status of a distinct family, most modern authors have considered tiger-beetles as a subfamily of Carabidae. Crowson (1967: 209), who had originally (1955) considered the Cicindelinae as a subfamily of Carabidae, however, suggested that the absence of urogomphi and ligula in larval tiger-beetles, labrum usually with more than six setae, and position of the front tibial spurs in adults, support *familial status* for tiger-beetles. The subject has not yet been exhausted, as is true for other groups which will be discussed elsewhere, but I prefer, for the moment, to follow those authors who consider the group with Carabidae.

Horn (1910) proposed arrangement of the Cicindelinae in two groups, Alocosternales (=Collyrinae Csiki, 1906) and Platysternales (=Cicindelinae Csiki, 1906). The alocosternal genera were arranged in two tribes, Ctenostomatini (=Ctenostomini *auct.*) and Collyrini. Of these only Ctenostomatini have Neotropical representatives: Collyrini are asiatic, and also occur in the Sunda and Australia. The Platysternal genera were arranged in the tribes Mantichorini (a small group of deserticolous species from southern Africa), Megacephalini and Cicindelini. Each of these tribes was subdivided in subtribes.

Rivalier (1971, 135 ff), studied the higher divisions of the tribe Cicindelini (in the present sense), making several changes in relation to Horn's system. Subtribe Prothymina has a new definition, including the genus *Dromica* Dejean, 1826, which Horn had segregated in a sub-tribe of its own, the Dromicina. The following Neotropical genera are included: *Odontocheila* Castelnau, 1834, *Cenothyla* Rivalier, 1954, *Pentacomia* Bates, 1872, *Phyllodroma* Lacordaire, 1843, *Cheilonycha* Lacordaire, 1843, *Prepusa* Chaudoir, 1850, *Oxygonia* Mannerheim, 1837, and *Metopon* Fleutiaux, 1899. Subtribe Iresina is described as new to include *Euprosopus* Dejean, 1825 and *Iresia* Dejean, 1831, both usually placed in the Prothymina (*Langea* Horn, 1901, the third genus of the subtribe in Horn's sense, unknown to Rivalier, is said to probably belong here as well), and *Eucallia* Guérin, 1844, the latter usually considered as belonging to Megacephalini. Subtribe Teratina is restricted to the Indo-Malayan Region. Subtribe Cicindelina remains unchanged, only including all groups described by Rivalier himself as distinct genera. Subtribe Apteroessina is described as new for an Indian genus.

Classification of the South-American species is poorly understood, in part due to intense individual variation of many of the species, which has not been taken into account in the past (and still is not by some authors). Many species, especially of *Cicindela*, have numerous "varieties" and "subspecies", which certainly are not more than individual variants.

Most of our species have been described by Walther Horn; in recent years there have been scattered papers by several authors, but especially Mandl and Rivalier. The only life history data on our species, including descriptions of larvae and pupae, are by Zikán (1929: 269-414, 133 figs). Luederwaldt (1915: 25-27) presented some data on habits of a few species.

The small Chilean fauna (six species) was revised by Peña and Barria (1973).

Tribe Ctenostomatini (=Ctenostomini *auct.*)

This tribe includes only two genera, *Pogonostoma* Klug, 1835, exclusively Madecassan, and *Ctenostoma* Klug, 1821 (=*Caris* Fischer, 1821; =*Procephalus* Castelnau, 1834; =*Myrmecilla* Lacordaire, 1843), from the Neotropical Region. *Ctenostoma* includes 49 species which are distributed from Mexico to southern Brazil and Paraguay. Of these 40 have been recorded from Brazil.

Adults of *Ctenostoma* live in the canopy and subcanopy of lowland tropical forest, and are very active. Zikán (1929) described habits, larvae and pupae of some species, which contrary to immatures of other species of the subfamily, develop in rotting logs.

Tribe Megacephalini

The Neotropical Region lacks only *Platychilina*, a monobasic subtribe from southern Africa.

KEY TO SUBTRIBES AND GENERA OF NEOTROPICAL MEGACEPHALINI (ADULTS)  
(adapted from Horn, 1910: 117 ff)

- |        |  |                                      |
|--------|--|--------------------------------------|
| 1      | Palpigerous scale of labial palpus at maximum extended to cut of mentum. Elytron without humerus, with pseudo-humerus and pseudo-epipleuron, whose upper angle forms a carina. Posterior coxae separated. Dorsal surface without designs . . . . . | Omina . . . . .                      |
|        | .....  | <i>Pycnochila</i> Motschulsky, 1856. |
| 1'     | Palpigerous scale of labial palpus extended beyond cut of mentum. Elytron without pseudo-epipleuron, with humerus various, hidden under pseudo-humerus or not. Posterior coxae touching each other sagitally . . . . .                             | Megacephalina . . . . .              |
|        | .....  | 2.                                   |
| 2 (1') | Disc of pronotum and apical parts of elytron rugose. Head excavate between eyes. Anterior and median coxae each with several setae. Elytron with latero-median and apical anterior spot . . . . .  | <i>Eucallia</i> Guérin, 1844.        |
| 2'     | Disc of pronotum and elytral apex not rugose. Head not excavate between eyes. Anterior and median coxae at maximum with single, long seta. Elytron without latero-median spot . . . . .  | 3.                                   |
| 3 (2') | Lateral margin of elytron with stridulatory apparatus beginning at metasternum, and hind femur with stridulatory file on internal, median third. Without abdominal designs . . . . .   | 4.                                   |
| 3'     | Elytron and femur without stridulatory apparatus. Usually with abdominal designs . . . . .   | 5.                                   |
| 4 (3)  | Tarsomere 5 normal, equal in length to preceding segments, with sparse ventral setae. Tarsomeres 1 - 3 of anterior tarsus of male widened. Labrum and extremities (legs and antennae) yellow or not . . . . .                                      | <i>Oxycheila</i> Dejean, 1825.       |
| 4'     | Tarsomere 5 different from preceding segments, widened and densely pubescent underneath. Front tarsus of male hardly extended. Labrum and extremities black . . . . .  | <i>Cheiloxia</i> Guérin, 1855.       |

- 5 (3') Labrum with sagital tooth long and narrow, with marginal setae, black as body extremities. Clypeus without seta. Scutellum visible. Articles 1 - 3 of anterior tarsus of male with adhesive setae in symmetrical, double row ..... *Pseudoxycheila* Guérin, 1839.
- 5' Labrum without sagittal tooth, short and transverse, usually with submarginal setae. Clypeus with lateral seta. Scutellum hidden. Three of male with adhesive setae in an asymmetrical double row ..... 6.
- 6 (5') Abdominal design clear (yellow marginal spot on sternum VI and abdominal apex black). Labrum with marginal setae. Elytra irregularly rugose. Extremities and setae black ..... *Aniara* Hope, 1838.
- 6' Abdomen without clear pre-apical design. Labrum usually with submarginal setae. Elytra never rugose. Extremities usually, palpi yellow extremities setae light most specimens yellow .. *Megacephala* Latreille, 1802.

#### Subtribe Omina

1. *Pycnochila* Motschulsky, 1856 (=*Agrius* Chevrolat, 1854). Monobasic [*P. fallaciosa* (Chevrolat, 1854), from the Straits of Magellan]. The other two genera which form this subtribe are restricted to western United States.

#### Subtribe Megacephalina

2. *Aniara* Hope, 1838 (=*Aniaria* Horn, 1893; =*Scythropa* Hope, 1838). Monobasic, from northwestern South America, also recorded from Brazil.

3. *Megacephala* Latreille, 1802. A very diverse, worldwide genus, with numerous Neotropical species. Horn (1910: 130 ff) arranged the species in several groups, which might be used as subgenera. As suggested by Basilewsky (1966: 13-14) in a revision of the African species, at the moment it is not possible to divide the genus. The following groups occur in the Neotropics: *Metriocheila* Thomson, 1857, with a single species from Colombia, Peru, Bolivia and Argentina; *Phaeoxantha* Chaudoir, 1850 (=*Ammosia* Westwood, 1852) with eight species, of which six are from Brazil; Group of *asperula*, with a single species from Peru and Brazil; Group of *germaini*, also monobasic, from Argentina; *Tetracha* Hope, 1838, with several Australian species, and 31 Neotropical species (of which 18 are from Brazil).

4. *Oxycheila* Dejean, 1825 (=*Oxychila* auct.; =*Rhaminagrobis* Thomson, 1857; =*Cophognathus* Waterhouse, 1889). An exclusively Neotropical genus with 28 species, especially of the eastern parts of South America (west of the Andes), of which 13 have been recorded from Brazil. Adults are nocturnal, living near streams and waterfalls (Zikán, 1929: 305).

5. *Pseudoxycheila* Guérin, 1839 (=*Pseudoxychila* auct.; =*Centrocheila* Lacordaire, 1843). A monobasic genus from Venezuela, Colombia, Ecuador, Peru, Brazil and Costa Rica. Palmer (1976) provides an excellent account of the way of life of *P. tarsalis*, in Costa Rica.

6. *Cheiloxya* Guérin, 1855 (=*Chiloxia* auct.). Monobasic, from Guiana, Ecuador and Bolivia.

7. *Eucallia* Guérin, 1844 (=*Callidema* Guérin, 1843). Monobasic, from Ecuador and Colombia.

#### Tribe Cicindelini

Only the subtribes Dromicina and Theratina are not present in the Neotropical Region.

#### KEY TO SUBTRIBES AND GENERA OF NEOTROPICAL CICINDELINI (ADULTS)

- 1 Head, pronotum, prosternum, mesosternum, base of abdomen and

1'	elytra with setae, or posterior third of elytron with whitish design on suture or disc . . . . .	Cicindelina . . . . .	Cicindela Linnaeus, 1758.
2 ( 1' )	Head, pronotum, prosternum, mesosternum, base of abdomen and elytra glabrous. Posterior third of elytra without whitish design . . . . .		2.
2'	Elytral epipleuron and free lateral margin of hind coxa glabrous . . . . .	Prothymina . . . . .	3.
3'	Free lateral margin of posterior coxa densely pubescent, and elytral epipleuron glabrous or pubescent . . . . .	Odontocheilina . . . . .	5.
3 ( 2 )	Clypeus glabrous. Elytral apex with two or three angles and spines . . . . .	Euprosopus Dejean, 1825.	
3'	Clypeus with two setae. Elytral apex rounded . . . . .		4.
4 ( 3' )	Middle of frons without transverse impression. Labrum with saggital tooth and setae. Vertex without saggital swelling. Anterior coxa glabrous . . . . .	Langea Horn, 1901.	
4'	Middle of frons with at least one transverse impression. Labrum without saggital tooth and with seven setae. Vertex with saggital swelling extended to frons. Anterior coxa with single seta . . . . .	Iresia Dejean, 1831.	
5 ( 2' )	Posterior tarsomere 5 inserted dorsally to 4. Mentum with single seta on each side of median tooth . . . . .	Oxygonia Mannerheim, 1837.	
5'	Posterior tarsomere 5 inserted at apex of 4. Mentum without setae on sides of median tooth . . . . .		6.
6 ( 5' )	Apex of femur extended beyond femoral-tibial articulation. Elytral apex truncate and with long lateral spine . . . . .	Opisthencentrus Horn, 1893.	
6'	Apex of femur not extended beyond femur-tibial articulation. Apex of elytron without lateral spine . . . . .		7.
7 ( 6' )	Elytral epipleuron pubescent. Three basal tarsomeres of middle tarsus of male dilated . . . . .	Prepusa Chaudoir, 1850.	
7'	Elytral epipleuron glabrous. Three basal tarsomeres of middle tarsus of male normal . . . . .	Odontocheila Castelnau, 1834.	

## Subtribe Prothymina

1. *Euprosopus* Dejean, 1825. Two species in eastern Brazil. Adults live in clearings and along trails in the forest, where they remain on leaves to catch insects as *Odontocheila* (Zikán, 1929: 300), and *Iresia* adults do.
2. *Langea* Horn, 1901. Two South American species, not yet recorded from Brazil.
3. *Iresia* Dejean, 1831. With eight species which occur from southern Mexico to Brazil (six in the latter country) and Argentina. As *Euprosopus*, adults live on trees and shrubs chasing insects (Zikán, 1929: 298).

## Subtribe Odontocheilina

4. *Odontocheila* Castelnau, 1834 (= *Odontochila* *auct.*). Horn (1910: 196) included Neotropical, Ethiopian and Oriental species. Based exclusively on structure of the internal sac of the aedeagus, Rivalier (1969) divided the genus in four, all exclusively Neotropical in distribution. Provisionally Rivalier's genera could be considered as subgenera. Larochelle (1977) published an English translation of Horn's (1938) synopsis of the species and races of *Oxycheila*.

The few species for which way of life is known (Zikán, 1929: 301) live in the forest, in clearings and along trails, and adults are very good flyers.

- 4.1. *Odontocheila* s. str. (=*Diplocheila* Hope, 1840; =*Plochiocera* Hope, 1838). Includes 30 species.
- 4.2. *Cenothyla* Rivalier, 1969. Two species, from northern South America, one recorded from Brazil.
- 4.3. *Pentacomia* Bates, 1872 (included in *Cicindela* by Horn, 1910). This group is ranked by Rivalier at generic level, with five subgenera (here treated as groups):  
 Group of *Mesochila* Rivalier, 1969, with 9 species from eastern Brazil. Group of *Poecilochila* Rivalier, 1969, with 5 South American species (all known from Brazil) and a single species from Guatemala. Group of *Mesacanthina* Rivalier, 1969, with 3 species from Central Brazil, Paraguay and Argentina. Group of *Beckerium* of Horn, 1897 (included by Horn in the exotic genus *Prothyma* Hope, 1838), with a single species in southern Mexico.
- 4.4. *Phyllodroma* Lacordaire, 1843. Single species, in eastern Brazil.  
 Horn (1910: 203) also included two subgenera in *Odontocheila*, treated as distinct genera by Rivalier (1969: 237).
- 4.5. *Cheilonycha* Lacordaire, 1843 (=*Chilonycha* auct.). Two species, from Brazil, Paraguay and Argentina.
- 4.6. *Promenton* Fleutiaux, 1899 (=*Metopon* Fleutiaux, 1899). Single, Brazilian species.
5. *Prepusa* Chaudoir, 1850 (=*Eulampra* Chaudoir, 1848). The three species included in *Prepusa* range from Venezuela to Argentina (all are known from Brazil). According to Zikán (1929: 304) they live in open areas, as *Cicindela*.
6. *Opisthencentrus* Horn, 1893. Monobasic, from southeastern Brazil.
7. *Oxygona* Mannerheim, 1837. With 16 species, which occur in Bolivia, Peru, Ecuador, Colombia and Panama.

### Subtribe Cicindelina

8. *Cicindela* Linnaeus, 1758. A highly diverse, worldwide genus, with nearly 700 species. In Horn's concept the genus is quite homogeneous, but more recent authors (especially of the "French school") have split the genus. Jeannel (1946: 143 ff) was the first author to propose the splitting, limiting himself to the species of Madagascar. In a series of papers, Rivalier (1950, 17: 217 ff; 1954, *ibidem* 24: 312 ff; 1961, *ibidem* 28: 121 ff; 1963, *ibidem* 30: 30 ff), dismantled *Cicindela*, recognizing 55 genera, most of which he described as new. Schilder (1953: 539-576), recognized 17 genera, synonymizing several of the names previously proposed by Rivalier (1950). Rivalier's work is based exclusively on structure of the internal sac of the aedeagus; Schilder's system is presently without any morphological basis.

In spite of very few authors accepting this division, it is convenient to use it to discuss the Neotropical fauna. Rivalier studied the Neotropical species in 1954 (including several species from southeastern United States), having placed them in the following "genera".

*Cylindera* Westwood, 1831. Thirty species, (eight in Brazil) placed in two subgenera: *Cylindera* s. str. and *Plectographa* Rivalier, 1954.

*Cicindelidia* Rivalier, 1954. Forty six species distributed from the United States, Mexico, through Central America to the west of South America.

*Habroscelimorpha* Dokhtourow, 1883. Ten species ranging from the United States to Venezuela and the Antilles.

*Eunota* Rivalier, 1954. A single species in the United States.

*Microthylax* Rivalier, 1954. Three species in Mexico and Cuba.

*Opilidia* Rivalier, 1954. Five species whose aggregate range extends from Central America to Colombia and Venezuela.

*Brasiella* Rivalier, 1954. Twenty three species distributed from Mexico to Argentina, of which 11 are recorded from Brazil. Rivalier (1955, 22: 77 ff) revised the *argentata* group of this "genus", describing three new species and several new subspecies.

*Ellipsoptera* Dokhtourow, 1883. Restricted to the United States, with nine species.

*Dromochorus* Guérin, 1845. With two Texan species.

Schilder (1953) placed the Neotropical species of *Cicindela* in three genera, as follows. *Phyllodroma* Lacordaire, 1843 (with subgenus *Pentacomia* Bates, 1872, which was later included in *Odontocheila* by Rivalier, 1969). *Dromochorus* Guérin, 1845, with two subgenera. *Dromochorus* s. str. including the type-species of Rivalier's *Cicindelidia* and *Microthylax*, as well as part of the species placed by Rivalier in *Cylindera* s. str.; and subgenus *Ellipsoptera* Dokhtourow, 1883 (=*Habroscelimorpha* Dokhtourow, 1883, and including the type-species of *Eunota* Rivalier, 1954, *Opilidia* Rivalier, 1954 and *Ellipsoptera* Dokhtourow, 1883). *Cicindosa* Motschulsky, 1864 (including the type-species of Rivalier's *Brasiella* and *Plectographa*).

The species of *Cicindela* s. lat. typically inhabit open areas, especially river margins and sea beaches. Adults fly readily.

### Subfamily Trachypachinae

A small, relict subfamily which is formed by two tribes (according to Lindroth, 1961), the monobasic *Gehringiini*, described from the Olympic Range in western North America, and the *Trachypachini*.

Bell (1964) discussed *Gehringia* Darlington, 1933, and doubted the “isochaetous” character of its adults. In a more recent paper (Bell, 1966: 107-112) he removed *Gehringiini* from *Trachypachinae*. It only seems to be certain that relationships of these primitive and relict groups have not been definitely established.

#### Tribe Trachypachini

A relict tribe, formed by two genera, *Trachypachus* Motschulsky, 1845 (with three Nearctic and one Palaearctic species), and *Systolosoma* Solier, 1849 (=*Notioxenus* Motschulsky, 1857), with two Chilean species, *S. brevis* Solier, 1849 and *S. lateritium* Nègre, (1973a).

Crowson (1955: 7) considered the *Trachypachini* as a distinct family because of several characters, suggesting also that they might be aquatic. Lindroth (1960, 25: 30-42), described the larva of *Trachypachus*, which is typically terrestrial, without aquatic adaptations. Bell (1964), however, concluded that *Trachypachini* are closely related to the three phyletic lineages of “*Hydradephaga*”, the *Haliplidae*, *Gyrinidae* and the complex of dytiscoid families. Crowson (1967: 209) concurs with this opinion. Bell (1964: 112), also discussed the problem of the relationships between *Trachypachus* and *Systolosoma*, which might not exist.

Nothing is known about the life history of members of *Systolosoma*.

### Subfamily Nototylinae (=Tylonotinae)

A monobasic subfamily of very obscure relationships, but apparently very primitive (without antenna cleaner on front tibiae). The group is based on a single species, *Nototylus fryi* (Schaum, 1863), type of *Nototylus* Gemminger & Harold, 1868 (=*Tylonotus* Schaum, 1863). The species is only known from the holotype, collected in the state of Espírito Santo, Brazil.

Bänninger (1927: 177, 178) discussed the relationships of the group, describing some characters not mentioned in the original description.

### Subfamily Cicindisinae

Also a subfamily of uncertain systematic position. Crowson (1955: 6) mentioned the subfamily very briefly (together with the preceding *Nototylinae*) when discussing the *Paussidae*, but considered both as *incertae sedis*. Bänninger (1927, 177) was the only other author who published notes on *Cicindis*, concluding that it is an independent group within the *Isochaeta*. Provisionally it seems best to consider both the *Cicindisinae* and the *Nototylinae* as independent subfamilies.

The *Cicindisinae* have a very strange, disjunct distribution. Only the genus *Cicindis* Bruch, 1908 is known, with the type-species, *C. horni* Bruch, 1908, described from Cordoba, Argentina, and *C. johnbeckeri* Bänninger, 1927, from Busher, Iran.

Practically nothing is known about way of life of these strange, rather tiger-beetle-like Carabidae. According to A. Martinez (pers. comm.), who collected one or two adults of the Argentinian species, it occurs in desertic areas, near salt lakes.

### Subfamily Paussinae

At present it is well established that paussids are true Carabidae (the first author to verify the fact seems to have been Burmeister, 1841: 76). Kolbe (1927: 205; 1930: 16) definitively

related the Paussini to Ozaenini, having been followed by more recent authors (Darlington, 1950; Crowson, 1954; Basilewsky, 1962; Lindroth, 1969b: xxi). Other authors, like Jeannel (1941: 89; 1946: 45, 46), even though accepting the relationships between the two, continued to consider the Paussidae as a distinct family. Crowson (1954: 6) considered the group at family level, including the Ozaeninae in it.

Darlington (1950) arranged the paussids in three tribes, the Protopaussini, Paussini and Ozaenini. Protopaussini is a primitive tribe, monogeneric, and restricted to the Oriental Region. Paussini are myrmecophiles. Each species apparently occurs with a different species of ant, and the hosts are known to belong to the tribes Myrmicini or Camponotini. There seems to be no relationship between the classification systems of these ants and carabids (Jeannel, 1946: 60-61). Carvalho (1959) records several African species of *Paussus* in *Pheidole* nests (Myrmicini). In South America only one species was found in an ant nest (*Monacis*, Dolichoderini). Very little is known about the life history of the third tribe, the Ozaenini, but *Physea* adults and larvae have been collected from nests of *Atta* (Attini), the leaf-cutting ants.

Wasmann (1929) described 20 fossil species from Baltic amber (end of Eocene or beginning of Oligocene), which he placed in seven genera, of which only *Arthropterus* is present in the recent fauna (of Australia). Darlington (1950: 85) suggested that Wasmann exaggerated in description both of genera and species (all based on single specimens). Unfortunately a re-study of these fossils has not been undertaken.

#### Tribe Ozaenini

This tribe includes 14 genera (Bänninger, 1927) which occur in the Australian, Oriental, Ethiopian (including Madagascar) and Neotropical Regions (a few species are in southwestern United States).

Little is known about the habits of Ozaenini. Adults of some genera of the Oriental Region were collected in decaying wood; at least one species of *Physea* (possibly *Physeomorpha* as well), has myrmecophilous habits. Larvae are only known of *Physea* and *Pachytele* (van Emden, 1942: 24-25).

#### KEY TO GENERA OF NEOTROPICAL OZAENINI (ADULTS) (from Bänninger, 1927)

- 1 Tibia very wide and flat, at middle from two to three times as wide as minimum width at proximal end; dorsal surface very narrow. Inferior face of femur with deep sulcus. .... 2.
- 1' Tibia normal, at least more or less circular or oval in section in the middle, without cutting edge. Inferior face of femur non-sulcate. .... 3.
- 2 (1) Antenna long, extended beyond base of pronotum, antennomeres 5-10 almost cylindrical, longer than wide. Head slightly wider than long. Pronotum weakly convex in middle of disc, and more or less expanded laterally in horizontal or slightly raised margins .... *Physea* Brullé, 1834.
- 2' Antenna short, not extended beyond middle of pronotum, antennomeres 5-10 flattened, more or less quadrate. Head much wider than long. Pronotum strongly convex, sides not raised .... *Physeomorpha* Ogueta, 1963.
- 3 (1') Antennal pubescence more or less equally developed from scape to apical antennomere .... 4.
- 3' Antennal pubescence dense from antennomere 5; antennomeres 1-4 with sparse pubescence only .... 5.

- 4 (3) Antennae moniliform, extended beyond base or pronotum; median antennomeres, from side, at maximum 1.5 times as wide as long. Labrum short and transverse, internal part of mandibles exposed. Anterior femur usually with basal tooth ..... *Ozaena* Olivier, 1811.
- 4' Antenna very short, extended only to middle of pronotum; antennomeres 7-9 from side, about 2.5 times as wide as long. Mandibles covered almost to apex by labrum. Anterior femur with obtuse angle ..... *Platycerozaena* Bänninger, 1927.
- 5 (3') Middle coxae contiguous or at least not separated by meeting of metasternal and mesosternal processes ..... *Pachytele* Perty, 1830.
- 5' Middle coxae separated by meeting of metasternal and mesosternal processes ..... 6.
- 6 (5') Terminal labial palpomere short and thick, flattened, little or not narrowed toward truncate apex. Anterior femur strongly dentate. Anterior tibia deeply cut, with long spur ..... *Goniotropis* Gray, 1832.
- 6' Terminal labial palpomere elongate, more developed than penultimate article. Anterior femur without tooth ..... *Tropopsis* Solier, 1849.

1. *Ozaena* Olivier, 1811 (=*Ictinus* Castelnau, 1834). Nine species are included in this genus (Ogueta, 1965), distributed from Mexico to Argentina (five recorded from Brazil).

2. *Platycerozaena* Bänninger, 1927. Four species (Revision, Ogueta, 1965, *l.c.*: 361), from northern South America, Panama and Nicaragua. Three occur in northern Brazil.

3. *Goniotropis* Gray, 1832 (including subgenus *Scythropasus* Chaudoir, 1854). With 14 species ranging from Brazil (three Amazonian species) north to Mexico.

4. *Tropopsis* Solier, 1849. Two Chilean, one Central American species, and *Tropopsis virescens* Chaudoir, 1868, from the state of Espírito Santo, Brazil.

5. *Pachytele* Perty, 1830. This is the most diverse Neotropical genus of the tribe, with 50 species (plus one in the southern United States) of which 23 are Brazilian. There is no revision of the genus, and identification of the species is nearly impossible. A larva of one species from Guatemala was collected under bark (van Emden, 1942: 59).

6. *Physea* Brullé, 1834 (=*Trachelizus* Solier, 1836; =*Coeloxenus* Wasmann, 1925). Six species of *Physea* are known, with distribution ranging from Argentina to Mexico (three recorded from Brazil) (Ogueta, 1963b). The larva of *Physea setosa* Chaudoir, 1868, was described by van Emden (1936: 250-256) and was collected in nests of *Atta sexdens*; specimens of the same species, collected in Pernambuco in nests of the same leaf-cutting ant, were described by Wasmann as *Coeloxenus guentheri* (Reichardt, 1966a). Nothing has been recorded about habits of the other species.

7. *Physeomorpha* Ogueta, 1963. Monobasic, from northern Argentina, very close to *Physea*, possibly also myrmecophilous.

#### Tribe Paussini

A tropicopolitan tribe, best represented in the Old World tropics by 21 genera and nearly 500 species (Darlington, 1950). Only two genera are in the New World, with a distribution which extends from Mexico (Veracruz and Yucatan) to Argentina (Misiones).

Darlington (*l.c.*) arranged the paussine genera in six subtribes, of which only the Cerapterina (one of the two subtribes of the "Primitive Paussids") is represented in America.

The Neotropical species have been revised by Carvalho (1963) and Pallister (1954). Darlington (1964) recorded the tribe for Mexico, its northern limit. No species has thus far been found in the Antilles.

Larvae and pupae of African species are known (Carvalho, 1959). The New World species are rare and poorly known. The only recorded of myrmecophily is that of *Homopterus steinbachi* Kolbe, 1920, from Colombia, collected in a nest of *Monacis bispinosa* (Olivier, 1791) (Dolichoderinae, Dolichoderini) (Darlington, 1950: 48).

Kolbe (1920) described a South American species of *Paussus*, *P. (Edaphopaussus) americanus*, and tentatively related the species with a supposed *Paussus* from Australia, suggesting an antarctic land-bridge to explain its presence. According to Darlington (1950: 108), both species (and specimens) were mislabelled, both are African and belong to different genera (*Paussus* thus does not exist in Australia or South America).

KEY TO GENERA OF NEOTROPICAL PAUSSINI (ADULTS)  
(from Carvalho, 1963)

- 1 Tibia narrow and internally sinuose; tarsi not retractable. Antennal club narrower, with apex and base of intermediate articles straight . . . . .  
..... *Eohomopterus* Wasmann, 1920.
- 1' Tibia more triangular, wide, with apical excavation for reception of tarsus. Antennal club wider, with base of articles sinuose, or very wide with bases and apices of segments straight . . . *Homopterus* Westwood, 1841.
1. *Eohomopterus* Wasmann, 1920. With only two species, *E. centenarius* Carvalho, 1960, from Rio de Janeiro, and *E. aequatoriensis* (Wasmann, 1899), from Ecuador. Both are only known from single specimens.
2. *Homopterus* (*sensu lato*) Westwood, 1841. The species of this genus are arranged in two subgenera:
- 1 Articles of antennal club with basal and apical margins angulate . . . . .  
..... *Arthropteropsis* Kolbe, 1920.
- 1' Articles of antennal club with straight basal and apical margins . . . . .  
..... *Homopterus* s. str..

2.1. *Homopterus* (*sensu stricto*) (=*Neopaussus* Thomson, 1860). This subgenus includes 10 species, of which three are known from Brazil.

2.2. *Arthropteropsis* Kolbe, 1920. A monobasic subgenus, whose species is known from El Salvador, Bolivia, and Brazil.

DIVISION ANISOCHAETA

As discussed above, under Isochaeta, an adult anisochaetous carabid has its antenna cleaner developed between the two spurs of the anterior tibia. This group contains the great majority of tribes of Carabidae, grouped here in four subfamilies: Omophroninae, Carabinae, Pseudomorphinae, and Brachininae.

Subfamily Omophroninae

This subfamily contains a single tribe, the Omophronini. The single genus is *Omophron* Latreille, 1802. Most of the species are in the Holarctic Region. Several species, included in the subgenus *Stenomophron* Semenov, 1922, occur in Mexico, one in Guatemala and Costa Rica [TLE], but are typical Nearctic elements in the fauna. A single species, *Omophron dominicensis* Chaudoir, 1868, was described from Santo Domingo, in the Greater Antilles.

Adults are distinctive in appearance because the body is so rotund. Larvae and adults live

in bare sandy areas, near bodies of either standing or flowing water. During the day, adults hide in burrows in soil, or under stones near the water's edge. They are easily dislodged by splashing their hiding places with water.

Bänniger (1921) and Semenov (1922) revised the world fauna of this subfamily. Benschoter and Cook (1956) revised the species of North America. [GEB]

### Subfamily Carabinae

I follow Lindroth (1961: 13; 1969: XXI) in fusing the classically accepted subfamilies Carabinæ and Harpalinae (see, for example, Crowson, 1954: 5,6, who distinguishes these two groups, and gives subfamilial rank to a third, the Scaritinae. Crowson considers the Brachinini, normally placed as a distinct subfamily, in Harpalinae; he does not mention the Pseudomorphinae). Lindroth (1969b: xvii-xxi) justified this action well enough, and there is no need to go into details here. I should, however, mention that in a general way the Carabinae correspond to the Caraboidea Simplicia, and the Harpalinae to the Caraboidea Limbata of Jeannel's system (1941, 1942a). Ball (1960: 91-92) follows this same scheme.

All Carabinae are anisochaetous, but in some groups, like the Carabini, and *Enceladus* (Sia-gonini) the distance between the two spurs is very small.

Van Emden (1963a), following older authors, accepted the division in Carabinae and Harpalinae, and within the latter studied and redefined the tribes with a seta in the mandibular scrobe ("Harpalinae Piliferae", as opposed to the "Harpalinae Impilae", with glabrous mandible). In his characteristically thorough study, van Emden defined the taxonomic position of several poorly known genera.

As considered in this paper, the Carabinae thus include most tribes of Carabidae, several of which are not represented in the Neotropical Region. Obviously, it is very difficult to distinguish the tribes in a key, and there is no doubt that the proposed structure is provisory. It will become very apparent that many groups are quite heterogeneous, while some others will probably be combined in the future.

The following tribes of Carabinae are not represented in the Neotropical Region:

- (1) Cychrini (see p. 384).
- (2) Nebrini. Of Holarctic distribution, but not represented in Mexico.
- (3) Opisthiini. Two closely related genera are included: one monobasic genus from western United States and Canada; and a second monobasic genus from the slopes of the Himalaya.
- (4) Elaphrini. A tribe with few genera and species, of exclusively Holarctic distribution.
- (5) Promecognathini. A tribe with few genera and species, and with a remarkably disjunct distribution: one genus in the western United States and Canada, along the Pacific coast; and three genera confined to the Cape region of Africa. Lindroth (1961: 125) included the Promecognathini in the tribe Scaritini.
- (6) Perochnoristhini. A monogeneric tribe from southwestern Africa, described by Basilewsky (1973) as a subfamily.
- (7) Pogonopsini. A monogeneric tribe from northern Africa, combined by most authors with the Pogonini.
- (8) Patrobini. A Holarctic tribe with few genera and species, none of which range as far south as Mexico.
- (9) Cymbionotini (=Granigerini). A tribe with few genera and species that inhabit the Ethiopian, Oriental and southern Palaeartic Regions.
- (10) Zabriini. A Palaeartic group, combined by many authors with the Amarini. Zabrides (strict sense) are known only from the Palaeartic Region.
- (11) Cuneiectini. A monogeneric tribe with two species, restricted to Australia.
- (12) Agonicini. An Australian tribe, with two genera and four species, from Tasmania and southeastern Australia, apparently related to Peleciini (Moore, 1963a).
- (13) Idiomorphini. A monogeneric tribe, from India.
- (14) Graphipterini. An almost exclusively Ethiopian tribe, but with a few species in the Middle East.
- (15) Corsyriini. A monogeneric tribe, restricted to Asia. Probably it should be included in the Masoreini.
- (16) Discoperini. A monogeneric tribe, restricted to Arabia and southwestern Russia. Probably it, too, should be included in the Masoreini.
- (17) Orthogoniini. A tribe with few genera and species, mainly in the Oriental Region (including the Indo-Australian Archipelago), and with a few species in Africa. They are evidently termitophiles. A supposed Neotropical orthogoniine, *Coeloxenus guentheri* Wasmann, 1925 is actually a species of *Physea* (Ozaenini).

- (18) *Amorphomerini* (=Trimerini). A monogeneric tribe with a few species in Africa and Madagascar.  
 (19) *Physocrotaphini* (=Helluodini). A tribe of few taxa, most of which are in the Oriental Region. A few species have reached New Guinea.  
 (20) *Anthiini*. A moderately diverse tribe, mostly of very large carabids. The group is predominantly Ethiopian in distribution, but there are a few Oriental species.

The taxonomic status of some of these tribes is in doubt. Careful study must be taken to determine relationships of the included genera to other groups of Carabidae, as a basis for establishing the positions of these tribes.

### Tribe Carabini

In South America, carabines are included in two genera, *Calosoma* Weber, 1801, and *Ceroglossus* Solier, 1848, each with few species. In temperate regions of the Northern Hemisphere, the tribe is represented by many species, most of which are included in *Calosoma sensu lato*, and *Carabus* Linnaeus, 1758. Adults of most species are large, and many are elegant in form and color. This has attracted the attention of unskilled workers who have caused substantial confusion at generic, specific and subspecific levels.

Lapouge (1929-1931) recognized five subtribes: Ceroglossina, Aplothoracina (a monobasic subtribe for an endemic genus of Saint Helena (see Basilewsky, 1972)), Calosomina, Carabina, and Cychrina. The last named group is generally ranked as a tribe (see p. 384).

Larvae of both Neotropical genera are known (van Emden, 1942: 22-23).

### KEY TO GENERA OF NORTHERN MEXICAN AND NEOTROPICAL CARABINI (ADULTS)<sup>1</sup>

- 1 Antennomeres 2 and 3 carinate. Mandibles at least basally with transverse corrugations. Labrum black. Elytra with humeri well developed (hind wings normally developed), or sloped (hind wings reduced) ..... *Calosoma* Weber, 1801.  
 1' Antennomeres 2 and 3 cylindrical, not carinate. Mandibles smooth, or finely punctate. Labrum black or metallic. Elytra with humeri sloped (hind wings reduced) ..... 2.  
 2 (1') Labrum metallic. Pronotum with more than two pairs of marginal setae. Most specimens with tuft of supraorbital setae. Dorsal surface metallic blue, coppery, or green. Specimen from temperate South America ..... *Ceroglossus* Solier, 1848.  
 2' Labrum black. Pronotum with two pairs of marginal setae. Head with single pair of supraorbital setae. Dorsal surface black with margins of pronotum and elytra purplish. Specimen from northwestern Mexico ..... *Carabus* Linnaeus, 1758.

1. *Calosoma* Weber, 1801. A genus worldwide in distribution, with many species, subspecies, varieties, and aberrations. The genus has been the subject of two important world revisions: Breuning (1927-1928b); and Jeannel (1940). The Nearctic species were treated by Gidaspow (1959), who also revised the Central and South American species (Gidaspow, 1963).

The group was treated very differently by these authors, and a universally accepted system has not been established. Breuning considered the genus as formed by 20 subgenera, of which four are represented in South America. Jeannel recognized 20 genera, placing most South American species in *Castrida* Motschulsky, 1865. In the revision of Neotropical *Calosoma*, Mrs. Gidaspow recognized a single genus, with the South American species arrayed in five subgenera.

The following key and subgenera are based on Mrs. Gidaspow's work (1959 and 1963).

Lindroth (1961: 42 and following), studying the Canadian fauna, eliminated the subgenera of *Calosoma*, and recognized informal taxa designated as species groups. In part, these coincide with the subgenera of previous authors.

Larvae and adults of *Calosoma* are predators of lepidopterous larvae. Costa Lima (1952: 262-263, fig. 43), referred to a larva of *Calosoma* from northeastern Brazil (Pernambuco; from its distribution, probably *C. granulatum* Perty, 1830), locally named "tesoureiro" and a predator of noctuid larvae. The way of life of species of other regions is better known. According to Lindroth (1961: 44), most adults are strong fliers, coming from great distances at the time of mass eclosion of caterpillars. Of the species of *Calosoma* on the South American mainland, only one, *Calosoma bridgesi* Chaudoir, 1869, has apterous adults.

KEY TO SUBGENERA OF NORTHERN MEXICAN  
AND NEOTROPICAL *CALOSOMA* (ADULTS)

- 1 Metepisternum distinctly longer than wide. Hind wings well developed . . . . . 2.
- 1' Metepisternum slightly longer than wide, or not so (anterior and lateral margins about equal in length). Hind wings rudimentary or absent . . . . . 9.
- 2 (1) Pronotum with latero-basal seta close to hind angle. Tibia of most specimens finely, densely punctate; male with hind trochanter markedly arcuate and pointed apically . . . . . *Castrida* Motschulsky, 1865.
- 2' Pronotum without latero-basal seta. Tibia with few fine punctures, or surface smooth (excluding normal spines and grooves). Hind trochanter of male with apex rounded, hardly arcuate . . . . . 3.
- 3 (2') Terminal maxillary palpomere of same length as and hardly wider than penultimate palpomere. Labium with mental tooth small, blunt or not. Dorsal surface green, bright to brilliant; ventral surface with greenish or bluish luster . . . . . *Calodrepa* Motschulsky, 1865.
- 3' Terminal maxillary palpomere notably wider, shorter or not than penultimate palpomere. Mental tooth of most specimens longer and pointed. Ventral surface without or with metallic luster . . . . . 4.
- 4 (3') Pronotum with angulate or markedly arcuate sides; hind angles pointed in most specimens. Dorsum black . . . . . 5.
- 4' Pronotum with sides slightly arcuate, flattened or not at base; hind angles rounded. Dorsum black, brown, bronze, or green . . . . . 8.
- 5 (4) Elytron with striae deep, intervals convex, scaly throughout length. Pronotum narrow, ca. 1.5 times wider than long, sides markedly angulate . . . . . *Carabosoma* Gehin, 1885.
- 5' Elytral striae obliterated or fine toward apex, well developed basally, only; intervals flat, scaly at base, only. Pronotum ca. twice as wide as long, sides markedly to moderately angulate . . . . . 6.
- 6 (5') Hind trochanter asetose. Head either with sparse, large punctures and pronotum with rounded lateral angles, or head more finely and densely punctate, and sides of pronotum markedly angulate . . . . . *Camegonia* Lapouge, 1924.
- 6' Hind trochanter of most specimens with seta. Head finely punctate, densely so in many specimens. Pronotum with sides rounded, angulate or arcuate. . . . . 7.
- 7 (6') Pronotum with angulate or strongly arcuate sides; hind angles very small, pointed. Labium with mental tooth small, pointed . . . . .

- 7' ..... *Camedula* Motschulsky, 1865.
- 7' Pronotum with sides and hind angles more rounded. Mental tooth either blunt, or long and pointed ..... *Chrysostigma* Kirby, 1837 (in part).
- 8 (4') Head and metepisternum with sparse and large punctures. Antennomeres 5-11 uniformly pubescent ..... *Callitropa* Motschulsky, 1865.
- 8' Head finely and densely punctate. Antennomeres 5 and 6 of most specimens with elongate, glabrous spots. Metepisternum punctate, either finely and densely, or coarsely and sparsely ..... *Chrysostigma* Kirby, 1837 (in part).
- 9 (1') Specimen from South America ..... 10.
- 9' Specimen from Mexico ..... 11.
- 10 (9) Hind trochanter with seta. Elytra brown, without metallic luster, smooth. Length of body ca. 20 mm ..... *Neocalosoma* Breuning, 1927.
- 10' Hind trochanter asetose. Elytra coppery or bronze, with metallic luster. Length of body of most specimens less than 20 mm ..... *Castrida* Motschulsky, 1865 (in part).
- 11 (9') Pronotum with distinct apical marginal bead ..... 12.
- 11' Pronotum without apical marginal bead, or bead incomplete, evident laterally, only ..... 13.
- 12 (11) Pronotum not narrowed posteriorly, sides slightly arcuate; lateral bead notably wider at base, or not. Antenna short, hardly extended to humerus of elytron. Elytron smooth, striae fine or obliterated; intervals flat ..... *Blaptosoma* Gehin, 1885 (in part).
- 12' Pronotum narrowed posteriorly, sides arcuate anteriorly, straighter posteriorly; lateral bead narrowed from apex to base. Antenna longer, extended beyond humerus. Elytron with striae deeply impressed and intervals convex, or striae obliterated and intervals flat ..... *Calopachys* Haury, 1880 (in part).
- 13 (11') Pronotum with bead widened basally, sides slightly arcuate. Elytra smooth. Male with ligula of median lobe thread-like or flag-like apically ..... *Carabomimus* Kolbe, 1895 (in part).
- 13' Pronotum with narrow bead, not or barely perceptibly widened at base ..... 14.
- 14 (13') Head anteriorly with very fine, sparse punctures and wrinkles. Elytra smooth. Ligula of male median lobe terminated as hook ..... *Blaptosoma* Gehin, 1885 (in part).
- 14' Head without punctures and wrinkles dorsally, or these near eyes, only. Elytra striate or smooth ..... 15.
- 15 (14') Pronotum not narrowed posteriorly, sides slightly arcuate. Antenna short, hardly extended to humerus ..... *Carabomimus* Kolbe, 1895 (in part).
- 15' Pronotum narrowed posteriorly, sides arcuate anteriorly, straighter posteriorly. Antenna longer, extended beyond humerus ..... 16.
- 16 (15') Elytron widened apically, striae fine, impunctate, intervals flat ..... *Paracalosoma* Breuning, 1927.
- 16' Elytron with sides about parallel, striae punctate or not, shallow or deep ..... 17.
- 17 (16') Elytron with striae deep, not punctate at bottom, intervals convex; or striae obliterated apically, punctate basally, and intervals flat. Male with ligula of median lobe expanded and rounded apically .....

- 17' ..... *Calopachys* Haury, 1880 (in part).  
 Elytral striae distinctly punctate from base to apex, intervals convex or flat. Ligula of median lobe thread-like or flat-like apically ..... *Carabomimus* Kolbe, 1895 (in part).

1.1. *Castrida* Motschulsky, 1865 (=*Callistriga* Motschulsky, 1865; =*Catastriga* Lapouge, 1829; =*Caludemia* Jeannel, 1940; =*Microcalosoma* Breuning, 1927). Thirteen Neotropical species are included in this subgenus, of which only one, *C. sayi* Dejean, 1826, enters the Nearctic Region. Three are recorded from Brazil: *C. granulatum* Perty, 1830; *C. retusum* Fabricius, 1801; and *C. argentinense* Csiki, 1927. Two groups are confined to the Galapagos Islands: *C. granatense* Gehin, 1885, representing a monobasic group, whose three geographical races extend collectively throughout the archipelago; and the *galapageium* group, including *C. leluporum*, Basilewsky, 1968, *C. galapageium* Hope, 1838a and *C. linelli* Mutchler, 1925. For details, see Basilewsky (1968).

Adults of *C. granulatum* Perty preyed on larvae and pupae of the noctuids *Alabama argillacea* (Hubner) and *Spodoptera frugiperda* (J.E. Smith), in cotton fields near Santa Cruz, Bolivia (Allen, 1977). This predation reduced significantly the numbers of these lepidopterous pests of cotton plants. [GEB]

1.2. *Neocalosoma* Breuning, 1927. This is a monobasic subgenus, including *C. bridgesi* Chaudoir, 1869, known from Bolivia, Argentina, and Chile.

1.3. *Calodrepa* Motschulsky, 1865. Three Neotropical species are included in this group. All are in Middle America, and only *C. scrutator* Fabricius, 1775, enters northern South America. A fourth species, *C. wilcoxi* LeConte is known only from eastern United States and Canada.

1.4. *Carabosoma* Gehin, 1885. This is a monobasic subgenus, including only *C. angulatum* Chevrolat, 1834. This species ranges from southwestern United States to northern South America. South American populations are included in the subspecies *C. angulatum angulicolle* Chaudoir, 1869. The Middle American-Nearctic populations are in the nominotypical subspecies.

1.5. *Camegonia* Lapouge, 1924. One Neotropical species is included, ranging from Costa Rica to central United States: *C. marginalis* Casey, 1897. Two additional species are in northern Mexico and southern United States.

1.6. *Camedula* Motschulsky, 1865. This group includes four species, of which *C. glabratum* Dejean, 1831, ranges from Panama to Colombia, Peru and Bolivia. The other species are in northern Mexico and southern United States.

1.7. [*Chrysostigma* Kirby, 1837. Eleven species are included in this Nearctic subgenus. Four species are represented in northern Mexico, one of which, *C. affine* Chaudoir, ranges south to Oaxaca.]

1.8. [*Callitropa* Motschulsky, 1865. This Nearctic subgenus includes three species, whose aggregate range extends from the Mexican state of Oaxaca to northeastern United States.]

1.9. [*Paracalosoma* Breuning, 1927. This is a monobasic subgenus including *C. palmeri* Horn, 1876, whose range is confined to Guadalupe Island, off the coast of Baja California, Mexico.]

1.10. [*Blaptosoma* Gehin, 1885. Seven species are included, all of which live at higher elevations in Mexico, with one species, *C. atrovirens* Chaudoir, 1869, represented also in southwestern United States.]

1.11. [*Carabomimus* Kolbe, 1895. Sixteen species are included in this subgenus. Ranges of most species are confined to the highlands of the Trans-volcanic Sierra of Mexico, with one species occurring also on the eastern slopes of the Sierra Madre Occidental, in Durango. This subspecies requires a revision, based on good population samples and modern methods of analysis.]

1.12. [*Calopachys* Haury, 1880. Three species are included. All are in the eastern highlands of the Mexican state of Oaxaca, and one, *C. blaptoides* Putzeys, 1845, extends northward into the state of Puebla.]

2. *Ceroglossus* Solier, 1848. A genus endemic to Chile and the Argentinian slopes of the Andes. Few species are included, whose adults are apterous, and exhibit marked color variation. Because of this, European authors have applied a polynomial nomenclature to the species which are not well understood. Csiki (1927a: 307-313) recognized 10 species (with a total of 73 infraspecific names). Breuning (1928) recognized only six species. Lapouge (1931) reduced this number to four. In the most recent revision of the genus, Balazuc (1957) recognized seven species.

Ruiz Pereira (1937, 60: 381-425) described the larvae of the genus, and presented life history data on some of the species.

Classification of the genus has not been settled. It is interesting, with forms of very restricted distribution, probably adapted to different microhabitats. For a complete study, however, it will be necessary to do much field work, as well as to gather many specimens with exact locality and ecological data.

3. [*Carabus* Linnaeus, 1758. This is a Holarctic genus, with maximum divergence and diversity

in eastern Asia. It is represented in mesic mountain forests of Mexico by two species whose adults are brachypterous: *C. forreri* Bates, confined to the Sierra Madre Occidental and the Chiricahua Mountains of southeastern Arizona; and *C. hendrichsi* Bolivar, Rotger and Coronado, confined to several peaks in the Sierra Madre Oriental.] [GEB]

#### [Tribe Cychrini]

This is a Holarctic group whose members are closely related to the Carabini. *Scaphinotus* Dejean, 1826, a Nearctic genus, is represented by three species in the Sierra Madre Occidental of Mexico. (see Van Dyke, 1938, and Ball, 1970). Adults and larvae prey on snails. The species live in mesic mountain forests at altitudes above 2000 meters. [GEB]

#### Tribe Notiophilini

*Notiophilus* Dumeril is the only genus belonging to this tribe. It is Holarctic, and is represented on the fringes of the Neotropical Region by a pair of allopatric species that are closely related to one another, but not to any other Nearctic species (Ball, 1970). They are: *N. chihuahuae*, known only from the Sierra Madre Occidental of northwestern Mexico; and *N. specularis* Bates, whose range extends from the Sierra Madre Oriental of Mexico to the mountains of northwestern Guatemala. Populations of these species occupy drier forests and adjacent clearings, from about 1500 meters to tree line. Adults are active during the day. [GEB]

#### Tribe Hiletini (=Camaragnathini)

A tribe with relict distribution: *Hiletus* Schiödte, 1847 (with three subgenera) occurs in tropical Africa, Madagascar, Sumatra, Borneo and Vietnam (a total of 13 species), and the Neotropical genus *Neohiletus* Jeannel, 1938, with two Brazilian species, *N. batesi* (Chaudoir, 1861), an apterous, Amazonian species, and *N. brasiliensis* Nègre, 1967, a winged species from the states of Mato Grosso and São Paulo.

Nothing is known about habits of Hiletini, a group which is very rare in collections. Adults of some of the African species have been collected in forests (Jeannel, 1938a); their very peculiar mouthparts suggest special feeding habits.

#### Tribe Loricerini

Included is a single Holarctic genus, *Loricera* Latreille, 1802. The group is principally northern, but there is a monobasic subgenus on Madeira. Like *Notiophilus* (see above), the subgenus *Loricera* is represented along the northern fringes of the Neotropical Region by a pair of allopatric species that are closely related to one another, but not to other Nearctic species: *L. aptena* Ball and Erwin, known only from the Sierra Madre Occidental in northwestern Mexico; and *L. rotundicollis* Chaudoir, whose range extends from the southern portions of the Sierra Madre Oriental to the highlands of northwestern Guatemala. Populations of these species are in mesic forests at middle altitudes in mountainous areas. [GEB]

Ball and Erwin (1969) revised this group.

#### Tribe Siagonini (including Enceladini)

A primitive tribe of Carabinae with obscure relationships. Practically nothing is known about their way of life. In the Neotropical Region, the tribe is represented by the monobasic genus *Enceladus* Bonelli, 1813, which occurs in the Guiano-Venezuelan area, possibly also in Amazonia. *Enceladus* has usually been associated with the African genus *Luperca* Castelnau, 1840, with one species in Africa and one in India, to form the tribe Enceladini. There seems,

however, to be no doubt that *Siagona* Latreille, 1804, a moderately diverse (about 50 species) Old World genus, is related to the Enceladini, and it seems best to consider a single tribe for the three genera.

#### Tribe Migadopini (including Monolobini)

A tribe with seven genera and 12 species distributed in Australia, Tasmania, New Zealand, Auckland Islands and seven genera and 14 species on the southern tip of South America, Uruguay and Islas Malvinas.

Jeannel (1938b) considered the Migadopini and Monolobini as distinct subfamilies of his Migadopidae. It seems more realistic to consider the two groups as a single tribe as recently done by Straneo (1969a).

Nothing is known about habits of life history of the species in South America. Adults of most species are brachypterous.

#### KEY TO GENERA OF NEOTROPICAL MIGADOPINI (ADULTS)

(adapted from Jeannel, 1938b)

- |          |   |                                       |
|----------|---|---------------------------------------|
| 1        | Galea of one article. Ligula fused to membranous paraglossae. Elytron with small pit in the basal 0.25 of stria 3, (vestige of distal setigerous pore). Size small, unpigmented, elongate-ovoid, with long legs . . . . .   | Monolobus Solier, 1849.               |
| 1'       | Galea two-articled, distal article as long as preceding article, but tumid and fusiform. Ligula without paraglossae. Elytron without distal setae. Medium sized, pigmented. . . . .   | 2.                                    |
| 2 ( 1' ) | Middle tarsus of male simple, not dilated and without adhesive setae. Front tibia of male very wide. Tooth of mentum bilobed, ligula with single seta. Size large (10-18 mm), black, with large head, and transverse pronotum; elytron elongate, subdepressed, weakly striate . . . . . | <i>Lissopterus</i> Waterhouse, 1843.  |
| 2'       | Middle tarsi dilated or not in male. Front tibia simple in both sexes . . . . .   | 3.                                    |
| 3 ( 2' ) | Tooth of mentum large and salient, simple. Ligula with single seta . . . . .  | 4.                                    |
| 3'       | Tooth of mentum large, bilobed. Front tarsomere 4 truncate, not bilobed. . . . .  | 5.                                    |
| 4 ( 3 )  | Medium size (10 mm), brown, not metallic. Pronotum transverse, with narrow but regular marginal depression. Elytra opaque, with complete striae. Front tarsomere 4 bilobed . . . . .  | <i>Antarctonomus</i> Chaudoir, 1861.  |
| 4'       | Larger (13-14 mm), blue or green metallic, smooth and shiny, with testaceous subapical, rounded spot on each elytron. Pronotum not transverse, with wide marginal depression. Elytra smooth. Front tarsomere 4 not bilobed . . . . .  | <i>Migadopidius</i> Jeannel, 1938.    |
| 5 ( 3' ) | Mandibles rugose. Terminal palpomeres elongate, truncate at apex. Large (12-13 mm), body short, oval, opaque, brownish-black. Pronotum transverse, with wide marginal depression and basal surface strongly punctate. Elytron short and wide, with deep striae . . . . .                | <i>Rhytidognathus</i> Chaudoir, 1861. |
| 5'       | Mandibles smooth. Palpomeres short, fusiform. Color more or less metallic . . . . .   | 6.                                    |
| 6 ( 5' ) | Elongate. Prosternal apophysis extended backward over mesosternum.  |                                       |

- 6 ( 5') (con't) Pronotum transverse, with almost square hind angles. Elytra elongate with superficial, fine striae, somewhat erased laterally. Umbilicate series with 15-20 punctures. Length of body 10-12 mm ..... *Migadops* Waterhouse, 1842.
- 6' Short, oval, convex. Prosternal apophysis normal. Pronotum subcordiform, with sharp hind angles. Elytron short, with striae well marked by lines of coarse punctures. Umbilicate series not evident. Length of body 7-10 mm ..... *Pseudomigadops* Jeannel, 1938.
1. *Monolobus* Solier, 1849. Two species, *M. testaceus* Solier, 1849 from the Valdivia area, and *M. ovalipennis* Straneo, 1969, from Volcán Calbuco.
2. *Migadops* Waterhouse, 1842 (=*Brachycoelus* Chaudoir, 1842). Two species, one with three subspecies (from Tierra del Fuego, south and central Chile, and Islas Malvinas), and *Migadops jeanneli* Nègre, 1973, from Chile.
3. *Pseudomigadops* Jeannel, 1938 (=*Migadops* Chaudoir, 1861, nec Waterhouse, 1842). Four species in Tierra del Fuego and one on the Islas Malvinas.
4. *Rhytidognathus* Chaudoir, 1861. Monobasic, from Uruguay, the northernmost record of any migadopine in South America.
5. *Antarctonomus* Chaudoir, 1861. Monobasic, from central Chile and Tierra del Fuego.
6. *Migadopidius* Jeannel, 1938. Monobasic, from central Chile.
7. *Lissopterus* Waterhouse, 1843. Two species, one endemic to Islas Malvinas and the second with one subspecies on Islas Malvinas and one in Tierra del Fuego.

#### Tribe Scaritini

Scaritini form one of the more diverse tribes of Carabinae, occurring in all major zoogeographical regions. Genera are numerous, and several genera are very rich in species.

There are no recent revisions of the Neotropical Scaritini as a whole, except for Bänninger's world monograph of the Scaritina (see below). Even the subdivisions of the tribe are not well established; many genera have not been critically studied in recent years, so their positions must be considered provisional.

One of the subtribes of Scaritini, the Scapterina, has usually been listed for the Neotropical Region with one genus, *Listropus* Putzeys, 1863. However, *Listropus* is now regarded as a subgenus of *Schizogenius* Putzeys, 1846 (Whitehead and Reichardt, 1977), and the Scapterina are thus not represented in the New World (see also Jeannel 1946: 220).

The subtribe Ardistomina is here combined with Clivinina, because relationships among their respective genera are not known. Kult (1950) limited the Ardistomina to *Ardistomis*, *Aspidoglossa*, and *Neoreicheia*, as genera with dilated male protarsi, but this probably plesiomorphic characteristic is not stable even in this lineage; also, the key characteristics used to distinguish *Neoreicheia* (reduced eyes and enlarged genae) occur in various *Ardistomis* s. str.. These three genera along with *Oxydrepanus* and such Old World genera as *Reicheia*, *Syleter*, and allies probably do form a monophyletic radiation, but even if so its precise relationship to other Clivinina is not known. Some workers have assigned *Schizogenius* and *Solenogenys* to the Ardistomina, but the former is a clivinine and the latter a salcediine. [DRW]

The isolated position of *Dyschirius* and allies, usually assigned to the Clivinina, was discussed by Bruneau de Miré (1952) and Whitehead (1969); they belong to a separate subtribe, Dyschiriina, of unclear affinity. [DRW]

KEY TO SUBTRIBES OF NEOTROPICAL SCARITINI (ADULTS)<sup>1</sup>

- 1 Head ventrally with antennal groove on each side ..... *Salcediina*.  
 1' Head ventrally without antennal grooves ..... 2.  
 2 ( 1') Antennal scape with single preapical setigerous puncture ..... 3.  
 2' Antennal scape asetose ..... 5.  
 3 ( 2) Clypeus asetose. Maxillary excision (ventral notch each side of mentum) not extended to base of submentum. Size large (length of body 20 mm or more) ..... *Pasimachina*, *Pasimachus* Bonelli, 1813.  
 3' Clypeus with pair of setae. Maxillary excision deep, extended to base of submentum ..... 4.  
 4 ( 3') Elytron with lateral series of umbilicate punctures reduced to two groups of 0-3 punctures behind humerus and before apex ..... *Dyschiriina*, *Dyschirius* Bonelli, 1810.  
 4' Elytron with lateral series of umbilicate punctures either not interrupted or at least not strongly so ..... *Clivinina* (= *Ardistomina*).  
 5 ( 2') Mentum with median tooth longer than lateral lobes, extended obliquely dorsad almost to ventral surface of labrum. Mandibles endentate, falcate, slender. Head with one or more pairs of supraorbital setigerous punctures ..... *Forcipatorina*.  
 5' Mentum with tooth subequal in length to lateral lobes, not extended dorsad. Mandibles with large teeth basally. Head with single pair of supraorbital setigerous punctures ..... *Scaritina*.

## Subtribe Pasimachina

This subtribe is represented by two genera, one in the Oriental Region and the other in the Nearctic and northern Neotropical. [DRW]

1. *Pasimachus (sensu lato)* Bonelli, 1813. This genus of large scaritines includes about 33 species. The range extends from the prairies of southern Canada southward to the lowland forests of Panama, including montane forests of Mexico and Central America [TLE] to elevations of about 2500 meters. Little is known about the way of life of these animals, though it is likely that they prey on large insect larvae. Captive adults of *Pasimachus* s. str. seem to eat any insect they can catch, and one individual of the subgenus *Emydopterus* in Mexico was found eating a large xystodesmid milleped [DRW]. Alexander (1958, 1962) reported on the rather complex mating behaviour exhibited by a pair of adult *Pasimachus punctulatus* (Haldeman).

Bänninger (1950) revised the group, recognizing two subgenera as indicated in the following key.

KEY TO SUBGENERA OF *PASIMACHUS* BONELLI, 1813 (ADULTS)  
(from Bänninger, 1950)

- 1 Pronotum with each hind angle with setigerous puncture (most specimens); basal margin beaded in most specimens. Antennomeres 2-4 of most specimens more or less compressed and sharply carinate. Hind tibia with, in addition to four rows of setae, one or several large setigerous punctures dorsally, near apex ..... *Pasimachus (sensu stricto)*.

- 5' Hind angles of pronotum without setigerous punctures; basal margin beaded laterally, only. Antennomeres 2-4 not carinate. Hind tibia of most specimens without setigerous puncture dorsally, near apex . . . . . *Emydopterus* Lacordaire, 1854.

1.1. *Pasimachus* (*sensu stricto*). With 20 species, whose aggregate range extends from southern Alberta to the Trans-Volcanic Sierra of Mexico, and including one species, *P. sallei* Chaudoir, 1862, whose members live in the tropical lowlands of Tamaulipas. Bänninger (1956) described the subspecies *P. sallei scapularis*.

1.2. *Emydopterus* Lacordaire, 1854 (*Molobrus* Putzeys, 1846). With 13 species, whose aggregate range extends from Panama northward to the southwestern slopes of the Trans-Volcanic Sierra of Mexico. [GEB]

#### Subtribe Scaritina

A large, cosmopolitan subtribe, with usually large members, many of fossorial habits, and with brachypterous or apterous adults.

#### KEY TO GENERA AND SUBGENERA OF NEOTROPICAL SCARITINA (ADULTS) (adapted from Bänninger, 1938)

- 1 Maxillary lacinia rounded at apex, not curved or pointed; not truncate or dentate along internal margin; with ventral "strigae". Prosternal process glabrous. Metasternum setose or not. Body not pronouncedly narrow and elongate. Humeri dentate. Posterior angles of pronotum dentate or not. Median tibia with two dorsal spines . . . . . *Glyptogrus* Bates, 1881.
- 1' Lacinia curved and pointed, or truncate and dentate along internal margin . . . . . *Scarites* Fabricius, 1775 . . . 2.
- 2 (1') With ventral "strigae". Clypeus of most specimens with one pair of setigerous punctures. Pronotum with postangular seta and at least one anterior. Metasternum of most specimens with one or more setigerous punctures . . . . . 3.
- 2' Without ventral "strigae". Metasternum of most specimens asetose . . . . . 4.
- 3 (2) Metasternum, behind middle coxae, as long or longer than hind coxae. Frontal sulci not narrow and deep in most specimens, confused with the longitudinal rugosity between eyes . . . . . *Distichus* Motschulsky, 1857.
- 3' Metasternum of most specimens much shorter than hind coxae. Head with frontal sulci shallow, between supra-orbital setae usually with coarse punctures and longitudinal rugae. Prosternal process of most specimens punctate and setose. Middle tibia of most specimens with second tooth more or less developed . . . . . *Taeniolobus* Chaudoir, 1855.
- 4 (2') Metepisternum short, at external margin less than twice as long as anterior width. Metasternum, behind median coxae, usually shorter than posterior coxae. Median tibia with second tooth. Prosternal process glabrous . . . . . *Scalrophorites* Motschulsky, 1857.
- 4' Metepisternum not short, at external margin at least twice as long as anterior width. Metasternum at least as long as posterior coxae. Posterior angles of pronotum dentate or not . . . . . *Scarities* (*sensu stricto*).

The genera of Scaritina were monographed by Bänninger (1938a; 1938b; 1939; 1941). Practically nothing has been changed in relation to the Neotropical species; other faunas, however, have been studied (especially the African fauna, including Madagascar, by Jeannel and Basilewsky).

2. *Glyptogrus* Bates, 1881 (=*Glyptogaster* Chaudoir, 1879; =*Holcogaster* Chaudoir, 1879; =*Lioscarites* Maindron, 1904). Exclusively South American, with eight species, of which six are recorded from Brazil.

3. *Scarites* Fabricius, 1775. A highly diverse, cosmopolitan genus, whose species are placed in several subgenera. Only four of these occur in the Neotropical Region.

3.1. *Disichus* Motschulsky, 1857 (=*Lophogenius* Motschulsky, 1857; =*Scaritodes* Chaudoir, 1879; =*Adialampus* Gozis, 1882; =*Dischistus* Portevin, 1929). Species of this subgenus occur in the Old World and in the Neotropical Region (from Mexico to Argentina, including the West Indies). There are 17 Neotropical species (revision: Bänninger, 1938b), of which 12 are known from Brazil.

3.2. *Taeniolobus* Chaudoir, 1855 (=*Pleurogenius* Motschulsky, 1857; =*Stigmapterus* Motschulsky, 1857; =*Scaris* Chaudoir, 1879). This subgenus includes African, Oriental and 38 South American species (including a Cuban species), of which 29 occur in Brazil (revision: Bänninger, 1941). An undescribed species lives in Chiapas, Mexico. [GEB]

3.3. *Scarites* s. str. (=*Parallelomorphus* Motschulsky, 1850; =*Pharamecomorphus* Motschulsky, 1857). Species of *Scarites* live in almost all zoogeographical regions; in the New World there are species from the United States to Argentina, and also in the West Indies. Of the 13 Neotropical species, eight are known from Brazil (revision: Bänninger, 1938b).

3.4. *Scallopophorites* Motschulsky, 1857 (=*Glyptomorphus* Motschulsky, 1857; =*Scaritulus* Fairmaire, 1905). A subgenus with a large number of species in the Old World, and only two Neotropical, Brazilian species (revision: Bänninger, 1938b: 155).

3.5. *Antilliscaris* Bänninger, 1949. The three species of this West Indian subgenus are known only from Puerto Rico (Hlavac, 1969; Darlington, 1970).

#### Subtribe Forcipatorina (=Oxystomina)

A small subtribe of Scaritini which occurs predominantly (and possibly exclusively) in the Neotropical Region. Two Oriental genera have to be re-studied before their inclusion in the group is warranted. The species of the subtribe, placed in six genera (Reichardt, incomplete MS) are exclusively South American, with a single species known from the Lesser Antilles (Martinique).

The monobasic Mexican genus *Antroforceps* Barr, 1967, was assigned by Barr to the Forcipatorina. However, it would trace in the key to subtribes to the Clivinia. [DRW]

#### KEY TO GENERA OF FORCIPATORINA (ADULTS) (*Camptidius* Putzeys, 1867, not included)

- |        |   |                                   |
|--------|---|-----------------------------------|
| 1      | Supra-orbital setae four to seven pairs, behind eyes, beneath well developed longitudinal carina. Eyes reduced. Pronotum with several marginal setae. Antennae pubescent from article 5. Tibia shorter than femur. Abdomen without "strigae" on sterna IV to VI . . . . . | <i>Forcipator</i> Maindron, 1904. |
| 1'     | Only one or two pairs of supra-orbital setae, beneath longitudinal carina or not. Eyes normally developed. Pronotum with two submarginal setae. Antennae pubescent from article 3. Tibia at least as long as femur. Sterna IV to VI with "strigae" . . . . .              | 2.                                |
| 2 (1') | Two pairs of supra-orbital setae . . . . .  | 3.                                |
| 2'     | One pair of supra-orbital setae . . . . .   | 4.                                |
| 3 (2)  | Genae well developed behind eyes. Mandibles not flat. Supra-orbital setae in slight longitudinal depression, one in posterior ocular position and other almost at posterior angle of head . . . . .   | <i>Stratiotes</i> Putzeys, 1846.  |

- 3' Genae not developed. Mandibles plane. Supra-orbital setae in normal position ..... *Mesus* Chevrolat, 1858.
- 4 ( 2') Each supra-orbital seta beneath longitudinal well developed carina. Head narrow and elongate, more or less as wide as thoracic peduncle ..... new genus.
- 4' Each supra-orbital seta not beneath carina. Head much wider than thoracic peduncle ..... *Camptodontus* Dejean, 1826.

4. *Forcipator* Maindron, 1904 (=*Oxystomus* Latreille, 1825 nec Rafinesque). With four species, three of which are known from Brazil. Adults are large.

5. *Stratiotes* Putzeys, 1846. With nine species, of which one occurs on Martinique, and six in Brazil.

6. (Forcipatorina, new genus in Reichardt MS). Monobasic, from central Brazil.

7. *Camptodontus* Dejean, 1826. The largest genus in the subtribe, with 14 species, of which seven are recorded from Brazil.

8. *Camptidius* Putzeys, 1867. Monobasic, only known from Amazonia. Adults are evidently blind.

9. *Mesus* Chevrolat, 1858. With four species, three of which are Brazilian, and the fourth, the type-species *M. rugatifrons* Chevrolat, 1858, is known from Uruguay, Argentina and Paraguay (probably also to be found in southern Brazil). The genus has usually been placed in the Clivinina, and its position even in Forcipatorina is still provisory. It is most closely related to the African genus *Scolyptus* Putzeys, 1863, a genus usually placed among the Forcipatorina. Revision of *Mesus* in Reichardt (1974).

#### Subtribe Dyschiriina

See Whitehead (1969) for discussion of contents, characteristics, and general distribution of this subtribe. Kult (1950) recognized two genera for the Neotropical species that he studied: *Akephorus* LeConte, 1851, and *Dyschirius*. In fact, Lindroth (1961: 137) treated the two groups as congeneric, and he is followed here, but they probably should be regarded as distinct genera. However, the South American species referred to *Akephorus* by Kult (1950) belong to *Dyschirius*, subgenus *Dyschiridius* Jeannel, 1941 (Whitehead, 1969). [DRW]

10. *Dyschirius* Bonelli, 1810. Primarily a Megagaean genus, most of the species of this diverse genus are in the Nearctic and Palaearctic Regions. However, 18 described species are represented in the American tropics, with a known aggregate range extending as far southward as the Pampas of Argentina. No satisfactory subgeneric classification has been proposed, so subgenera are not recognized here. Members of *Dyschirius* live on bare clay or sand, near water. Adults and larvae, so far as known, prey on staphylinids of the genus *Bledius*, and on heterocerids. [GEB, DRW]

#### KEY TO SUBGENERA OF NEOTROPICAL *DYSCHIRIUS* BONELLI, 1810 (from Kult, 1950)

- 1 Tarsomeres and antennomeres moniliform; palpomeres shorter.  
Mandibles shorter with blunter apices ..... *Dyschirius* (*sensu stricto*).
- 1' Tarsomeres, antennomeres and palpomeres longer. Mandibles longer,  
with apices sharp ..... *Akephorus* LeConte, 1851.

10.1. *Dyschirius* (*sensu stricto*). With 12 known species in the area from Mexico to South America (one species described from Peru). The range of the group extends almost to the Arctic Coast in western North America.

10.2. *Akephorus* LeConte, 1851. With six species in South America (Brazil and Argentina) and two (including the

type species) on the Pacific Coast of North America, where its members inhabit the intertidal zone. It is most improbable that the South American species that Kult included in this group have been correctly assigned. The types should be studied to determine the correct assignment of these species. [GEB]

### Subtribe Clivinina

A highly diverse subtribe, with numerous genera and species. The group has been studied by Putzeys (1846; 1863; 1866), but there are no general recent studies. Several of Putzeys' genera have not been studied after their description, and identification is very difficult. Though some of these genera may not be valid, it is most probably that a careful study will show many new genera.

The following are included:

11. *Pyramis* Putzeys, 1846. Two species, only one of which is recorded from Brazil.
12. *Lachenus* Putzeys, 1846. Monobasic, from central America.
13. *Obadius* Burmeister, 1875. Two Uruguayan species.
14. *Cryptomma* Putzeys, 1846. Monobasic, from Colombia.
15. *Climax* Putzeys, 1863. Four Brazilian species.
16. *Nyctosyles* Putzeys, 1866. An Amazonian genus with three species, of which only one has been recorded from Brazil.

17. *Clivina* Latreille, 1802 (*Ceratoglossa* M'Leay, 1863). A markedly diverse, worldwide genus, of which 83 species occur in the Neotropical Region, from Mexico to northern Argentina, including the West Indies; 27 have been recorded from Brazil. Kult (1947) recognized four subgenera having Neotropical species: *Paraclivina* and *Semiclivina* Kult, *Clivina* s. str., and *Eupalamus*, Schmidt-Goebel, 1846 (= *Eupalamus*, Motschulsky, 1861). The name *Eupalamus* was previously used in Hymenoptera by Wesmael, 1845, and later in Diptera by Jaen-nicke, 1867, and this subgenus is here renamed *Richardtula* Whitehead, new name. Kult later (1959) regarded *Paraclivina* as a distinct genus, perhaps with good reason, but this action is not followed here; the four subgenera recognized by Kult seem clearly to represent distinct lineages, but at best they represent only a small portion of the Neotropical *Clivina* fauna and hence are not further discussed here. [DRW]

18. *Ancus* Putzeys, 1866, with four Brazilian species. According to Andrewes (1936: 212), two Oriental species belong to the genus as well.

19. *Schizogenius* (*sensu lato*) Putzeys, 1846. Whitehead (1972) revised North and Central American species, and partially treated South American species. Whitehead and Reichardt (1977) treated species of subgenus *Listropus*.

19.1. *Genioschizus* Whitehead, 1972, a subgenus described for the inclusion of nine Neotropical species, three of which are Brazilian.

19.2. *Listropus* Putzeys, 1863, revised and treated as subgenus of *Schizogenius* by Whitehead and Reichardt (1977), a subgenus with seven species, four of which are Brazilian.

19.3. *Schizogenius* (*sensu stricto*), a diverse subgenus with more than 64 species, of which 45 are Neotropical (and 10 recorded from Brazil). One of the species, *S. ocellatus* Whitehead, 1972, was described from material from caves in the southern part of the state of Sao Paulo, Brazil, and the adults have reduced eyes.

20. *Halocoryza* Alluaud, 1919. A genus whose members are intertidal (Whitehead, 1966 and 1969), with four species: two African, one in the Antilles, southern Florida, Yucatan, and Panama's north coast [TLE], and one on the west coast of Mexico. Whitehead (1966) provides a key to species. Eventually, *Halocoryza* may best be considered congeneric with *Schizogenius*. [DRW]

21. *Oxydrepanus* Putzeys, 1866. A genus of minute members, exceedingly diverse in structure, doubtless related to *Neoreicheia*, and probably belonging to the ardistomine radiation. [DRW] Eight described species, from Mexico and southern Florida to northern South America and the Antilles; only two have been recorded from Brazil.

22. *Neoreicheia* Kult, 1950. With one species in southeastern Brazil, and five species in Middle America and the West Indies. [GEB]
23. *Ardistomis* Putzeys, 1846 (with subgenera *Ardistomis* s. str. and *Semiardistomis* Kult, 1950; *Ardistomiellus* Kult, 1950, is a synonym of *Semiardistomis*, new synonymy. [DRW] Formal action is not taken here, but *Semiardistomis* should probably be considered a distinct genus, as judged from considerations of genital structure, tarsal structure, and apparent parallels in types of adaptive radiation among *Oxydrepanus*, *Neoreicheia*, and *Ardistomis* s. str.. [DRW] *Ardistomis* s. lat. is exclusively American, with 59 Neotropical species which occur from Mexico and the Antilles to Argentina. Twenty two have been recorded from Brazil.
24. *Aspidoglossa* Putzeys, 1846. A New World genus with 25 Neotropical species (distributed from southeastern United States to northern Argentina and Antilles), of which 10 have been recorded from Brazil.
25. *Antroforceps* Barr, 1967. A monobasic genus, cavernicolous, from Mexico, here reassigned to Clivinina from Forcipatorina as a probable part of the ardistomine radiation. [DRW]

#### Subtribe Salcediina (=Zelmina)

A relict subtribe of Scaritini with few genera, and of very obscure relationships. One genus, *Salcedia* Fairmaire, 1899 (=Zelma Andrewes, 1920), has six African and a single Asian species. The other two genera are Neotropical. The subtribe is characterized by antennal grooves, which in the Neotropical genera are restricted to the head, while they extend to the prothorax in *Salcedia*. The group has been revised by Reichardt (1975).

Nothing is known about habits, but the species are apparently riparian. They might represent a very primitive group of Scaritini, which might be related to the Rhysodini, a tribe of Carabidae of uncertain position, as indicated below.

#### KEY TO GENERA OF NEOTROPICAL SALCEDIINA (ADULTS)

- 1      Antennomere 2 twice as long as 3. Head with one pair of supra-orbital setae; pronotum with anterior marginal pair of setae; elytron with row of five setae along stria 3. Elytron with longitudinal carinae connected by transverse carinae. Color reddish-brown, each elytron with elongate, black longitudinal band between carinae 1 and 3 . . . . .  
..... *Holoprizus* Putzeys, 1866.
- 2      Antennomere 3 twice as long as 2. Head, pronotum and elytra without setae, but covered with minute, whitish scales. Margin of pronotum and elytra non crenulate. Elytra only with raised longitudinal carinae, 1 fused to 3 at apex. Color greyish-brown . . . . .  
..... *Solenogenys* Westwood, 1859.
26. *Holoprizus* Putzeys, 1866. Monobasic, known only from very few specimens from Brazilian Amazonia.
27. *Solenogenys* Westwood, 1859 (=*Aulacinia* Thomson, 1857). Two species are known, one from the Amazonian Forest (states of Amazonas and Pará, and a second species from northern Mato Grosso, at the edges of the Amazonian Forest.

#### Tribe Rhysodini (=Rhysodidae)

The inclusion of rhysodids as a tribe of Carabidae rather than a family of its own (which previously was even placed among the Polyphaga, near Colydiidae), has been advocated

in recent years by Bell & Bell (1962) and Bell (1970). Hlavac (1975), in a paper on the prothorax of Coleoptera, includes the Rhysodini as a tribe of Carabidae. According to these authors the Rhysodini have typical caraboid characters, and it might be added that if such groups as Cicindelinae, Omophroninae and Paussinae, among others, are included in Carabidae, the same treatment should be given the Rhysodidae.

Their closest relatives among Carabidae seem to be the Scaritini, and in my view they are closest to the subtribe Salcediina, whose adults have a superficial resemblance with Rhysodini, and also have the widely separated hind coxae, with a large intercoxal piece. They have, however, as typical Scaritini, the transverse suture in front of the hind coxae, which is absent in Rhysodini.

The tribe is relatively small, formed only by two genera (each composed of several subgenera) with worldwide distribution, and a total of about 130 species. Bell (1970) revised the North and Middle American and Antillean fauna, Vulcano & Pereira (1975; in press) the South American species.

The Rhysodini are adapted to life in rotting wood, a habitat shared by adults and larvae. Larvae of Neotropical species are thus far undescribed; Böving (1929: 69, pl. 15) described the larva of the North American *Clinidium sculptile* Newman, 1838: Burakowski (1975, 32: 271 ff) described that of the European *Rhysodes sulcatus* (Fabricius, 1787).

#### KEY TO GENERA AND SUBGENERA OF NEOTROPICAL RHYSODINI (ADULTS)

(adapted from Grouvelle, 1903; Bell, 1970 and Vulcano & Pereira, 1975)

- 1 Elytron with first (sutural) interval not depressed at anterior end; basal scarps of elytra thus continuous. Elytra punctate-striate, each with seven striae. Eyes lateral, usually large and rounded, rarely reduced (in a Cuban species) . . . . . *Rhysodes (sensu lato)* Dalman, 1823.  
First (sutural) interval strongly depressed below level of disc at anterior end; basal scarps of elytra thus widely separated. Elytra sulcate, each with six sulci. Eyes longitudinally elongate, reduced or absent . . . . . *Clinidium (sensu lato)* Kirby, 1835.
- 2 Median area of head separating frontal lobes . . . . . *Rhysodes (sensu stricto)*.  
Median area of head not separating the frontal lobes . . . . . *Omoglymmius* Ganglbauer, 1892.
- 3 Lateral sulci of disc of pronotum complete, extended to anterior margin of pronotum . . . . . *Rhysodiastes* Grouvelle, 1903.  
Lateral sulci of disc of pronotum incomplete, extended to only about middle of pronotum . . . . . 4.
- 4 Pronotum with two marginal grooves, separated by carina . . . . . *Arctoclinidium* Bell, 1970.  
Pronotum with one marginal groove, without carina . . . . . *Clinidium (sensu stricto)*.

1. *Rhysodes (sensu lato)* Dalman, 1823 (=*Rhyzodes*, *Rhysodes auctt.*). A genus very poorly represented in the Neotropics. Bell (1970: 302) reports an undescribed species from Cuba, which should be placed in *Rhysodes s. str.*

1.1. *Omoglymmius* Ganglbauer, 1892. The two South American species of *Rhysodes*, according to Grouvelle (1903), belong in this subgenus. Vulcano & Pereira (in press) revised the two species, which are in Bolivia and Brazil.

2. *Clinidium (sensu lato)* Kirby, 1835. A worldwide genus, whose species are arranged in

several subgenera. The classically accepted subgenus *Clinidium* s. str. was subdivided by Bell (1970); Vulcano & Pereira (1975) continue to use *Clinidium* s. str. in this classical sense. Three of the subgenera of *Clinidium* thus occur in the Neotropical Region.

2.1. *Arctoclinidium* Bell, 1970. A Nearctic subgenus which ranges into Mexico and the Guatemalan highlands (with two species in Mexico and one in Guatemala.)

2.2. *Clinidium* s. str. This subgenus is well represented in the Neotropical Region, with 13 species endemic in the Antilles (most described as new by Bell, 1970), two species in Costa Rica, and 13 species in northern South America (especially the Amazonian Basin). The latter were revised by Vulcano & Pereira (1975).

2.3. *Rhysodiastes* Grouvelle, 1903. The type-species of this subgenus, *R. parumcostatus* Fairmaire, 1868 (included originally in *Rhysodes*), was described from Madagascar, and is at present considered conspecific with the Brazilian *Clinidium costatum* Chevrolat, 1873. It is most probable that the type was mislabelled, but the question has not yet been settled. Vulcano & Pereira (1975) list three species in this subgenus, two Amazonian (one of them extending into the Atlantic Forest), and one in southeastern Brazil.

#### Tribe Apotomini

A monogenic tribe, with Palaearctic (four), African (10), African-Asiatic (two), Sumbawan (one) and Australian (two) species. A distinct species was recently discovered in a few close localities in northern Mato Grosso, Brazil. There seems to be no doubt that the species belongs to *Apotomus* Illiger, 1807. It has, however, not yet been described.

Practically nothing is known about the habits of the species of this tribe. Larvae are unknown. The Brazilian specimens were collected at light, near streams, together with large numbers of aquatic beetles of several families.

#### Tribe Psydrini (=Nomiini)

A tribe with few taxa, especially from temperate parts of the World. Van Emden (1936a: 50-51) reorganized the tribe, including in it several genera of uncertain systematic position, and recognizing five subtribes. In this new system two South American genera, formerly of uncertain position, were included in two of the subtribes.

#### KEY TO SUBTRIBES OF NEOTROPICAL PSYDRINI (ADULTS)

- |         |  |   |
|---------|--|---|
| 1       | Base of elytron margined . . . . .   | Melisoderina, <i>Tropopterus</i> Solier, 1849.    |
| 1'      | Base of elytron not margined . . . . .   | 2.  |
| 2 ( 1 ) | Abdominal sterna IV-VI each with sharp transverse suture near posterior margin. Some setae of umbilical series of elytron unusually long. Head, disc of pronotum, and elytral intervals punctate. Scutellum normally developed. Body sub-pedunculate . . . . . | Nomiina, <i>Nomius</i> Laporte, 1834.             |
| 2'      | Abdominal sterna without sharp transverse sulci. Setae of umbilical series of normal length. Head, pronotum and elytral intervals impunctate. Scutellum very small, or indistinct. Body not pedunculate . . . . .  | Meonidina, <i>Bembidiomorphum</i> Champion, 1918. |

#### Subtribe Nomiina

1. *Nomius* Laporte, 1834. Two species are included in this genus, one of which is known only from Africa. *N. pygmaeus* (Dejean, 1831) is Holarctic, transcontinental in the boreal forest of the Nearctic Region, with the range evidently extending in the mountains to the northern part of the Neotropical Region: one specimen was collected in a pine forest at 2100 m elevation in the highlands of Chiapas, Mexico.

The normal habitat is probably forest, and specimens have been collected under bark of

logs. Adults fly, and are attracted to light, at night. If disturbed, a beetle emits from its pygidial glands a powerful disagreeable odor, hence the common name "stinking beetle" for this species (Lindroth, 1961: 175).

Specimens of the related *Psydrus piceus* LeConte, 1846, have been collected in southern Arizona (McCleve, 1975), and may be expected in the mountains of Middle America. Adults have all articles of the antennae pubescent, in contrast to *N. pygmaeus* specimens, in which articles 1-3 have only the normal fixed setae. Also members of the two groups differ in details of the elytra: a small humeral tooth and absence of setigerous punctures characterize *N. pygmaeus*; whereas absence of a humeral tooth and presence of one or two discal setigerous punctures characterize *P. piceus*. [GEB]

#### Subtribe Meonidina

Straneo (1969a) regards this group as a tribe, the Meonidini.

2. *Bembidiomorphum* Champion, 1918. Monobasic, from Chile. Csiki (1928a: 144) included the genus in Merizodini; van Emden (1936a: 51) transferred it to Psydrini, considering the genus as representative of the Meonidina. Van Emden's Meonidina are formed by the pterostichine subtribe Meonidi (of Csiki, 1928: 484), with a few Australian representatives and the Chilean genus *Bembidiomorphum*.

#### Subtribe Melisoderina

3. *Tropopterus* Solier, 1849 (=*Tropidopterus* Gemminger & Harold, 1868). With a few New Zealand species, three in Chile and one in Peru. Csiki (1927b: 486) placed *Tropopterus* in the pterostichine subtribe Tropidopteri, but van Emden (1936a: 51) united *Tropopterus* with the subtribe Melisoderi, also of Pterostichini (with five Australian genera), to form the Melisoderina of Psydrini.

Sloane (1898, 23: 470) also included the "group Tropopterides" in the tribe Nomiini (=Psydrini), uniting in it the genera *Tropopterus* and *Mecyclothorax* Sharp, 1903. More recently Moore (1963b, 115: 277) considered a tribe Tropidopterini to include the genus in a subfamily Psydrinae. Straneo (1969a: 967) placed *Tropopterus* in Pterostichini, next to *Agonum*.

The first larva of the tribe (of *Melisodera picipennis* Westwood, 1835), was described from Australia (Moore, 1964: 244-245).

#### Tribe Broscini

This tribe includes 26 genera (Csiki, 1928a: 97), of peculiar distribution: Holarctic, Australian and southern part of the Neotropical Region.

Jeannel (1941: 286) extracted from the Broscini *Cnemalobus* Guerin, 1839 (=*Cnemacanthus auct.*), (which forms a distinct tribe, the Cnemacanthini). Ball (1956b) studied Broscini at the generic level, proposing a subdivision in three subtribes (of which one, the Broscina, is not represented in the Neotropics). There is an old revision of the tribe by Putzeys (1868).

Nothing is known of habits or larvae of the South American species.

#### Subtribe Barypina

A monobasic, exclusively Neotropical subtribe.

1. *Barypus* Dejean, 1828 (=*Odontomerus* Solier, 1849). A genus formed of three subgenera, the latter distinguished as follows (according to Putzeys, 1868).

KEY TO SUBGENERA OF *BARYPUS* (ADULTS)

- 1      Front tarsus of male enlarged ..... *Barypus (sensu stricto)*.  
 1'     Front tarsus of male and female normal ..... 2.  
 2 ( 1') Front tibia slightly widened at external extremity .....  
        ..... *Cardiophthalmus* Curtis, 1839.  
 2'     Front tibia not dilated ..... *Arathymus* Guerin, 1841.  
 1.1. *Barypus s. str.* Includes two species from Uruguay and two from Argentina.  
 1.2. *Arathymus* Guerin, 1841. With two Chilean species.  
 1.3. *Cardiophthalmus* Curtis, 1839 (=*Tetraodes* Blanchard, 1853). Two Patagonian and one Uruguayan species are placed in this subgenus.

## Subtribe Creobiina

According to Ball (1956b: 42) this subtribe occurs in South America and Australia. In this part of the World it includes two genera (distinguished as follows, according to Semenov, 1900: 80).

## KEY TO GENERA OF NEOTROPICAL CREOBIINA (ADULTS)

- 1      Head with single pair of supra-orbital setae. Pronotum with 1 or 2 pairs of marginal setae. Elytron without humeral plica ..... *Cascellius* Curtis, 1839.  
 1'     With three or more pairs of supra-orbital setae. Pronotum with four pairs of marginal setae, two pairs behind middle. Elytron with humeral plica ..... *Creobius* Guerin, 1839.  
 2. *Cascellius* Curtis, 1839. Four exclusively Chilean species.  
 3. *Creobius* Guerin, 1839. Originally described as a subgenus of *Feronia* (Pterostichini), Putzeys considered *Creobius* congeneric with *Cascellius* (1868: 306-307). Semenov (1900: 80) reinstated it as a valid genus. It includes two species, *C. eydouxi* Guerin, 1839, from Peru and Chile, and *C. australis* Schweiger, 1959, from Lago Nahuel Huapi, Argentina.

## Tribe Bembidiini

Tribe of worldwide distribution, predominant in cold and temperate regions of the northern Hemisphere. In South America the tribe is well represented in the southern parts; Central America and the Antilles have a small number of species, some with clear Nearctic relationships. The tropical species of South America have not been studied in recent years, and are rarely found in collections. Their generic status is thus uncertain. In recent years this fauna, especially the Tachyina, is being studied by T.L. Erwin. Jeannel (1962) studied the fauna of the southern parts of South America, unfortunately recognizing too many genus-group taxa. Thus, this fauna is still in need of a thorough revision.

The habits of Bembidiini are varied. Members of Bembidiina are mostly riparian or seabeach species, a few occur near inland ponds and at the edges of wet alkaline sloughs. Anillina includes tiny endogeal, anophthalmous individuals which live in deep humus in upland habitats. Several new species were recently discovered in Guatemala using sifting and berlese methods; many more will doubtless be found throughout the Neotropical Region. Tachyina are the most diverse of the tribe. These rather small beetles occur as arboricole, in wood and under bark, epigean and hypogean, near water of all kinds, on sea beaches, and near other salt deposits. Several live among epiphytes in the canopy. Larvae are known for *Tachyta* and *Tachymenis* (Erwin, 1975) and probably for *Xystosomus* (Erwin, 1975; van Emden, 1942). [TLE]

KEY TO SUBTRIBES OF NEOTROPICAL BEMBIDIINI (ADULTS)<sup>1</sup>

- 1 Front tibia truncate, not notched apico-laterally ..... 2.  
 1' Front tibia obliquely and strongly notched apico-laterally ..... 3.  
 2 (1) Abbreviated scutellar interneur\* present; recurrent groove of elytral apex absent ..... Bembidiina.  
 2' Abbreviated scutellar interneur absent; recurrent groove of elytron present ..... Tachyina, in part (*Xystosomus* and *Mioptachys*).  
 3 (1') Body pale and generally pilose; with or without eyes, *IF* with eyes the head somewhat withdrawn into pronotum ..... 4.  
 3' Body pale or dark, with fixed tactile setae only; eyes always present; head never withdrawn into pronotum ..... Tachyina.  
 4 (3) Labrum deeply notched and covering mandibles; elytral apices soft, separated at suture, and more or less truncate; flight wings and eyes usually present ..... Tachyina, in part (*Limnastis* and *Micratopus*).  
 4' Labrum entire and not covering mandibles; elytral apices normal, not soft, held together at suture (often fused) and rounded; flight wings and eyes always absent ..... Anillina.

## Subtribe Anillina

Jeannel (1937, 1963) published two monographs about this group. Predominantly occurring in temperate zones, there are few representatives in the Neotropical Region. Taglianti (1973) studied the Middle American species, and related to these the Galapagan genus *Mystroceridius* Reichardt, 1970, of uncertain position. It is most probable that the poorness of our tropical fauna is due to the lack of collections in suitable habitats.

The following genera are included:

1. *Nothanillus* Jeannel, 1962. Monobasic, Chilean, the only representative of the Anillina in the fauna of southern South America.
2. *Stylulus* Schaufuss, 1882 (=*Petrocharis* Ehlers, 1884). A monobasic genus from the Virgin Islands and southeastern United States, originally described in Colydiidae.
3. *Stylulites* Jeannel, 1963. Monobasic, from southern Brazil (Santa Catarina).
4. *Geocharidius* Jeannel, 1963. A genus described for *Anillus integripennis* Bates, 1882, from Guatemala. A second species was described by Taglianti (1973) from caves in Chiapas, Mexico.
5. *Mexanillus* Taglianti, 1973. Troglobitic, monobasic, also from Chiapas, Mexico.

## Subtribe Tachyina (including Micratopina, = Limnastina)

A diverse subtribe, until very recently very chaotic from the taxonomic point of view. Most authors have considered Micratopina (=Limnastina) a distinct group, but Erwin (1974c), united the Micratopina and Tachyina. Jeannel (1962) studied the Tachyina (*sensu stricto*) of the southern tip of South America, having described a few new genera. Erwin (1974a) redefined the genera, synonymizing some names proposed by Jeannel, and is publishing revisions of the genera. (Erwin, 1973, 1974a, 1975a).

1 [TLE]

\* "Interneur". Erwin (1974a: 4) writes "Eight structural rows on each elytron is plesiomorphic in Tachyina. In certain groups, one or more of these structural rows have disappeared. In describing these animals it is sometimes necessary to indicate which rows have been lost . . . One cannot state "stria 7 absent" without meaning the plesiomorphic elytral structure was indeed a stria; it may have been a serial row of punctures or some other modification of the unnamed structure. In this case I have adopted a new term to mean the basic elytral structure occurring between the elytral intervals and this term is "interneur".

KEY TO GENERA OF NEOTROPICAL TACHYINA (ADULTS)  
(from Erwin, 1974c: 127-128; see Erwin, 1974a, for elytral setae codes)

- 1 Elytron impunctate, with eight longitudinal carinae extended from base to apex. Pronotum with five carinae ..... *Costitachys* Erwin, 1974.
- 1' Elytra, pronotum and head non-carinate or, elytra carinate-punctate ..... 2.
- 2 ( 1') Mentum without deep foveae, with or without shallow depressions on each side ..... 3.
- 2' Mentum with two deep foveae, each circular or horseshoe-shaped ..... 8.
- 3 ( 2 ) Front tibia almost or perfectly truncate at apex ..... 4.
- 3' Front tibia strongly cut apico-laterally ..... 5.
- 4 ( 3 ) Elytral disc without setae Ed2-6. Specimen convex ..... *Xystosomus* Schaum, 1863.
- 4' Elytral disc with setae Ed3 and 5. Convex or depressed, with strongly reflexed pronotal margins ..... *Mioptachys* Bates, 1882.
- 5 ( 3' ) Elytra and abdominal sterna sparsely pubescent, usually remaining parts of body also pubescent. Testaceous or flavo-testaceous color. Head slightly or strongly retracted in pronotum. Recurrent stria of elytron absent or weakly marked ..... 6.
- 5' Elytra and abdominal sterna not pubescent. Testaceous or black. Head not retracted in pronotum. Recurrent stria well marked ..... 7.
- 6 ( 5 ) Anal sternum of both sexes with four long setae along posterior margin, lateral setae falciform ..... *Micratopus* Casey, 1914.
- 6' Anal sternum with long, erect setae: male with two, female with four ..... *Lynnastis* Motschulsky, 1862.
- 7 ( 5' ) Recurrent stria of elytron short, curved, closer to suture than to lateral margin. Form convex or subdepressed ..... *Elaphropus* Motschulsky, 1839.
- 7' Recurrent stria elongate, straight, very close to lateral margin. Form usually depressed ..... *Tachyta* Kirby, 1837.
- 8 ( 2' ) Recurrent stria elongate, extended anteriorly beyond seta Ed6, and from there curved backward, hook-shaped ..... 9.
- 8' Recurrent stria short, curved, not extended beyond seta Ed6, or elongate, and near lateral margin ..... 10.
- 9 ( 8 ) Elytral interneur\* 8 subsulcate beyond middle, with apical portion of sulcus curved medially behind setae Eo5 and 6. Recurrent stria in form of hook around Ed6 ..... *Paratachys* Casey, 1918.
- 9' Elytral interneur 8 subsulcate, but not curved medially next to Eo5 and 6. Recurrent stria in form of hook around Ed6 or erased near Ed6 ..... *Tachys* Stephens, 1829.
- 10 ( 8' ) Pronotum without posterior angles. Form pedunculate. Interneur 8 externally absent ..... *Liotachys* Bates, 1871.
- 10' Pronotum with posterior angles, or at least not with pedunculate form. Interneur 8 complete, or at least present anteriorly and/or posteriorly ..... 11.
- 11 (10') Elytral interneurs erased or weakly striate. Form small and depressed or subdepressed. Testaceous or flavous ..... *Polyderis* Motschulsky, 1862.
- 11' Elytral interneurs punctate or sulcate-striate ..... 12.

\* See footnote p. 397.

- 12 (11') Elytral interneur 8 with post-humeral fovea(e), usually in basal fourth or in the middle, or elytra with 8 completely punctate interneurs . . . . .  
 ..... *Pericompsus* LeConte, 1851.
- 12' Elytral interneur 8 non-foveolate, nor elytron with more than 5 interneurs externally visible . . . . . *Meotachys* Erwin, 1974.

6. *Costitachys* Erwin, 1974. Monobasic, described for the Amazonian *Costitachys inusitatus* Erwin, 1974.

7. *Xystosomus* Schaum, 1863. Includes 32 Neotropical species (21 occurring in Brazil), recently revised by Erwin (1973). The species of *Xystosomus* are arboricolous.

8. *Miopachys* Bates, 1882 (=*Tachymenis* Motschulsky, 1862, junior homonym of *Tachymenis* Wiegmann, 1835. For details, see Erwin, 1976). A predominantly Neotropical genus (12 named species, four in Brazil), with a single species in the Nearctic Region.

9. *Micratopus* Casey, 1914 (=*Blemus* LeConte, 1848, not Stephens). As redefined by Erwin (1974a), this genus includes three Antillean species, one from Brazil and one Nearctic. (Erwin (1974c: 125) mentions about 40 undescribed species in this genus).

10. *Lynnastis* Motschulsky, 1862 (=*Limnastis* auct. =*Paralimnastis* Jeannel, 1932). With most of its species in the Old World, this genus is represented in the New World by a single species, *L. americana* Darlington, 1934, from Cuba.

11. *Elaphropus* Motschulsky, 1839 (=*Tachylopha* Motschulsky, 1862; =*Tachyura* Motschulsky, 1862; =*Barytachys* Chaudoir, 1868; =*Sphaerotachys* Müller, 1926; =*Trepanotachys* Alluaud, 1933; =*Tachyphanes* Jeannel, 1946). A predominantly Holarctic genus, with numerous species in the Old World, several in the Nearctic, and 10 or so in the Neotropics.

12. *Tachyta* Kirby, 1837. A Holarctic genus. *T. hispaniolae* Darlington, 1934, occurs in the Antilles and *T. nana inornata* Say, 1823 ranges south to Belize. Revised by Erwin (1975a).

13. *Paratachys* Casey, 1918 (=*Eotachys* Jeannel, 1941). A worldwide genus, with hundreds of Neotropical species; almost totally undescribed. These are predominantly from Mexico, Central America and Antilles but several are known from Brazil and other countries.

14. *Tachys* Stephens, 1828 (=*Isotachys* Casey, 1918). A Nearctic genus, with several species in Mexico, Guatemala and Antilles. A single species is known from Argentina.

15. *Liotachys* Bates, 1871. A monobasic genus, widely distributed throughout the Amazonian Region. *Liotachys antennatus* Bates, 1871, was recently mistakenly described as *Asklepia ocellata* (Reichardt, 1974d).

16. *Polyderis* Motschulsky, 1862 (=*Microtachys* Casey, 1918 =*Neotachys* Kult, 1961 =*Polyderidius* Jeannel, 1962). Worldwide, with four species in Central America and the Antilles and one in Argentina. Erwin (1971b) described *P. antigua* from Tertiary Amber from Chiapas, Mexico.

17. *Meotachys* Erwin, 1974c. Neotropical, with eight species, of which four are known from Brazil. The genus has not yet been recorded from the Antilles.

18. *Pericompsus* (*sensu lato*) LeConte, 1851 (=*Tachysops* Casey, 1918 =*Tachysalis* Casey, 1918 =*Leiotachys* Jeannel, 1962 =*Leptotachys* Jeannel, 1962). In his recent revision of the genus, Erwin (1974a) arranged *Pericompsus* in three subgenera, two neotropical and *Upocompsus* Erwin, 1974, with nine species in the Australian Region.

The two Neotropical subgenera are distinguished as follows:

- 1 Interneur 8 with deep almost perforate fovea, in middle of elytron or slightly in front of middle. Each elytron also with two subhumeral, variously placed foveae. Setae Eo4 in position "d" . . . . .  
 ..... *Pericompsus* (*sensu stricto*).

- 1' Interneur 8 without fovea in or near middle. Foveae posterior to humeri shallow, each with seta, or small, perforated, in basal 0.25, next to seta Eo4c; or foveae absent . . . . . *Eidocompus* Erwin, 1974.

18.1. *Eidocompus* Erwin, 1974a. With 13 Neotropical species, of which six are known from Brazil.

18.2. *Pericompus* (*sensu stricto*). With 46 species, of which 14 are known from Brazil. Some species are in the United States and the Antilles.

Another new genus was recently discovered in the Amazon Basin and will soon be described. [TLE]

### Subtribe Bembidiina

A highly diverse subtribe, taxonomically complex, especially because of the large number of genera and subgenera described by Jeannel for the fauna of the southern tip of South America. This fauna needs to be restudied, and it is certain that only few of the genus-group taxa described by him need recognition.

Very few species are known from tropical parts of the Neotropical Region.

19. *Bembidion* (*sensu lato*) Latreille, 1802 (=*Bembidium* *auctt.*). A worldwide genus, subdivided in a large number of subgenera. Five are recorded from the Neotropics.

19.1. *Chrysobracteon* Notolitzky, 1914. According to Lindroth (1963) who presents a large list of synonyms for this subgenus, it is a subgenus of Holarctic distribution. Jeannel included a Chilean species in this same subgenus (Jeannel, 1962).

19.2. *Metallina* Motschulsky, 1850. Two species, one from Peru and one from French Guiana, are included in this subgenus, which is also Holarctic.

19.3. *Diplocampa* Bedel, 1896. Most species are Palaearctic, but with one in the United States and one in Venezuela.

19.4. *Cyclolopha* Casey, 1918. Two Mexican species.

19.5. *Philochthus* Stephens, 1829. According to Lindroth (1963: 259) this is a typically Palaearctic group. Five Central American species are included in it.

Twenty South American species of *Bembidion* are considered "incertae sedis".

20. *Notaphus* Stephens, 1828. Lindroth (1963: 357) includes *Notaphus* in *Bembidion*, and discusses its validity as a subgenus. Jeannel (1962) considered it as a distinct genus, with three subgenera in the southern part of South America:

20.1. *Notaphus* s. str. With 10 Chilean species.

20.2. *Austronotaphus* Jeannel, 1962. Four Chilean species.

20.3. *Notaphidius* Jeannel, 1962. Four Chilean species.

Incertae sedis: 6 South American species.

21. *Nothocys* Jeannel, 1962. With 11 Chilean and Patagonian species originally included in *Bembidion*.

22. *Notaphiellus* Jeannel, 1962. Includes species (six from Chile and Patagonia) originally placed in *Bembidion*.

23. *Notholopha* (*sensu lato*) Jeannel, 1962. Includes Chilean species of *Bembidion*, with two subgenera:

23.1. *Notholopha* (*sensu stricto*), with four species.

23.2. *Pacmophena* Jeannel, 1962. Five species.

24. *Pseudotrepaines* Jeannel, 1962. Monobasic, described for the Chilean *Bembidion derbesi* Solier, 1849.

25. *Peryphus* (*sensu lato*) Stephens, 1828. Lindroth considers this only as a species group of *Bembidion* (Lindroth, 1963: 312); several authors consider it as a subgenus; Jeannel raised it to genus. It is a very diverse group, with worldwide distribution. Jeannel recognized four South American subgenera:

25.1. *Peryphus* (*sensu stricto*). Four species in South America

25.2. *Antiperiphyphus* Jeannel, 1962. Includes 10 Chilean species.

25.3. *Chilioperyphus* Jeannel, 1962. Includes two Chilean species.

25.4. *Antiperyphanes* Jeannel, 1962. Includes two Chilean species originally placed in *Peryphus*.

27. *Plocamoperyphus* Jeannel, 1962. A monobasic genus from Chile.

28. *Notoperyphus* Bonnaud de Saludo, 1969. Includes two Chilean species.

29. *Bembidarenas* Erwin, 1972a. Described for *Bembidion reicheellum* Csiki, 1929, a species Jeannel (1962: 653) placed in *Plataphus* Motschulsky, 1864. Négre (1973a) described a second species of the genus, from the southern tip of South America.

#### Tribe Pogonini

A tribe of eight genera, according to Csiki, 1928, especially of the Old World, with halophile species whose members are encountered along sea shores or at the margins of salt lakes. Chaudoir (1871b) studied the whole group; the two genera occurring in the Neotropical Region were recently studied by Reichardt (1974a). Immature stages are only known for Old World species (van Emden, 1942: 17).

#### KEY TO GENERA OF NEOTROPICAL POGONINI (ADULTS)

- |    |   |                                     |
|----|---|-------------------------------------|
| 1  | Tooth of mentum bilobed. Penultimate maxillary palpalomere glabrous.<br>Pronotum with two pairs of marginal setae. Humerus of elytron with short, oblique carina, striae erased near base . . . | <i>Diplochaetus</i> Chaudoir, 1871. |
| 1' | Tooth of mentum simple. Penultimate maxillary palpalomere pubescent.<br>Pronotum with one pair of marginal setae. Humerus without carina; elytral striae complete . . . . .                     | <i>Ochtozetus</i> Chaudoir, 1871.   |

1. *Diplochaetus* Chaudoir, 1871. Two species in the United States, one in Mexico and one in the Antilles and northern South America (also recorded from Brazil). Members live on coastal and lowland saline beaches. Adults are nocturnal.

2. *Ochtozetus* Chaudoir, 1871. Monobasic. Populations of *Ochtozetus bicolor* (Brullé, 1838), known from Brazil, Uruguay and Argentina, live on river beaches, and adults seem to be nocturnal.

#### Tribe Zolini (=Merizodini)

A tribe with small, apterous adults, restricted to Australia, Tasmania, New Zealand and southern South America. Csiki (1928a: 223-226) recognized six genera.

Jeannel (1962) ordered the genera in two subtribes: Merizodina (occurring in Australia and South America) and Oopterina (restricted to the Australian Region). Only one genus is known from South America:

1. *Merizodus* Solier, 1849 (=*Dormeyeria* Enderlein, 1912). Three species, from southern Chile and neighboring areas of Argentina. One of the species is also recorded from the Islas Malvinas and Kerguelen Islands.

*Bembidiomorphum* Champion, 1918, has been transferred to Meonidina (p. 395).

#### Tribe Trechini

A tribe of small carabids of worldwide distribution, but with predominance of genera and species in the cold and temperate parts of the World (distribution similar to that of *Bembidion*). With regard to way of life, the taxa are organized in two groups, one with subterranean habits (usually cavernicolous species), with reduced eyes, and a terricolous group, with well developed eyes. A small subgroup of the latter are marine species, which live on rocks in the intertidal

zone. In the Neotropical Region marine species are only known from southern South America. In the tropical parts of the continent relatively few species are known, possibly because they have not been collected, since they occur in habitats rarely collected, *i.e.* humus and soil.

This tribe was one of the preferred groups of carabids of René Jeannel, who treated them as a subfamily in his classic monograph published in 1926, 1927 and 1928. More recently Jeannel studied the Chilean fauna (1962). Other groups which occur in the Andes have been studied by Mateu & Nègre (1972). The Nearctic fauna is better known (studies by Barr), including species which are in Mexico (especially studied by Barr and Bolívar; see also Taglianti, 1972).

One of the taxonomic problems with this group, a consequence of the large number of taxa included, is its higher classification. First considered a subfamily by Jeannel (1926) the group was later treated as a family by the same author (1942b, 1946, 1962). Barr (1971), Moore (1972) and others, have also considered it as a subfamily. Following the concept used for other groups in this family, it seems more accurate to consider them as a tribe, and the system proposed by Barr (1971) is here adopted, ranking his three tribes as subtribes, and not using the subtribes proposed by him. Jeannel (1962: 539) recognized five tribes (which would be equivalent to subtribes in our system), based especially on characters of the male genitalia. Several groups which were considered genera by Jeannel, will probably not be maintained in the future (see same comments from Bembidiini, p. 396).

Larvae of Neotropical species are unknown; those from the Old World are well known (van Emden, 1942: 28-30).

#### Subtribe Trechodina

1. *Cnides* Motschulsky, 1862. The sole Neotropical representative of the subtribe, studied by Jeannel (1958), with a distribution which ranges from Mexico to Brazil. It includes eight species, of which three have been recorded from Brazil.

#### Subtribe Perileptina

2. *Perileptus* Schaum, 1860. A genus characterized by pubescent eyes of adults. Only four Antillean species are known.

#### Subtribe Trechina

3. *Kenodactylus* Broun, 1909 (=*Aepomorphus* Jeannel, 1926). With disjunct distribution: one species on Campbell Islands (south of New Zealand) and one on Tierra del Fuego and Islas Malvinas. The species have marine habits.

4. *Thalassobius* Solier, 1849. Monobasic, from southern Chile, also of marine habits.

5. *Aemalodera* Solier, 1849 (=*Homalodera* *auct.*). Four species in Chile and neighboring areas of Argentina.

6. *Homaloderodes* Jeannel, 1962. Monobasic, from Chile.

7. *Trechisibus* (*sensu lato*) Motschulsky, 1862. A genus, with typically Andean distribution; it was studied by Mateu & Nègre (1972), who proposed the synonymy of *Pseudaepus* Schweiger, 1958. Mateu & Nègre consider six subgenera of *Trechisibus*.

7.1. *Trechisibus* (*sensu stricto*) (=*Pseudaepus* Schweiger, 1959). This subgenus includes 35 species, with a distribution which ranges from Peru, Bolivia, Chile and Argentina to the Islas Malvinas.

7.2. *Trechisibellus* Jeannel, 1962. Two Peruvian species.

7.3. *Trechisibiorites* Jeannel, 1962. Includes two species from Bolivia and northern Chile.

7.4. *Trechisibiderus* Mateu & Nègre, 1972. Includes 16 species from Peru, Bolivia, Chile and Argentina.

7.5. *Trechisibiooides* Uéno, 1972. Six Peruvian species.

7.6. *Trechisibitus* Bonniard de Saludo, 1969. Four Chilean species.

8. *Nothotrechisibus* Uéno, 1971. Monobasic, from Chile.  
 9. *Putzeysius* Jeannel, 1962. Monobasic, from northern Chile.  
 10. *Pseudocnides (sensu lato)* Jeannel, 1927. Andean in distribution. Mateu & Nègre (1972) recognized three subgenera.

- 10.1. *Pseudocnides (sensu stricto)*. Three Chilean species.  
 10.2. *Gipsyella* Schweiger, 1958. Originally described as a distinct genus, it was included in *Pseudocnides* by Mateu & Nègre (1972). The subgenus includes two species, one from Ecuador and one from Tierra del Fuego.  
 10.3. *Bolivioenides* Mateu & Nègre, 1972. Monobasic, from Bolivia.
11. *Trechichomimus* Mateu & Nègre, 1972. Monobasic, from southern Chile.  
 12. *Trechinotus* Jeannel, 1962. A Chilean genus, with three species.  
 13. *Oxytrechus* Jeannel, 1927. Four species, which occur from Ecuador, Peru and Uruguay to northern Chile.  
 [14. *Trechus* Clairville, 1806. Holarctic, with several species in the United States, and two species from higher altitude in Mexico.]
15. *Paratrechus (sensu lato)* Jeannel, 1920. The species are arrayed in two subgenera:

- 15.1. *Paratrechus (sensu stricto)*. With extensive distribution, from the United States to Brazil (from where a single species is known).

- 15.2. *Hygrodavalius* Bolivar, 1941. Endemic to Mexico, with two species.

16. *Mexaphaenops* Bolivar, 1943. An endemic genus of Mexico, with four troglobitic species. Of the genera of Trechini listed above, only two occur in Brazil, and are distinguished by the following key:

- 1      Mandibles with pre-molar tooth ..... *Cnides* Motschulsky, 1862.  
 Mandibles without pre-molar tooth ..... *Paratrechus* Jeannel, 1920.

#### Tribe Panagaeini

A tribe with 17 genera (Csiki, 1929: 347) of worldwide distribution. In the New World are five genera, of which four are in South America.

Jeannel (1942a: 984, 1949: 849) placed the genus *Tichonilla* Strand, 1942 together with the panagaeine *Brachygnathus* Perty, 1830 in a subfamily Tichoniinae of his Panagaeidae. The characters used to distinguish Tichoniinae from Panagaeinae are not good, and it is my opinion that *Tichonilla* is not a panagaeine. The placement of *Brachygnathus* in this tribe seems also debatable (see discussion under Peleciini, p. 429).

Nothing is known about the habits and way of life of the South American species. Adults of *Brachygnathus* have been collected in recent years by R.L. Araujo in the "caatinga" of northern Minas Gerais and northeastern Brazil under logs. Immature stages have been described for Old World species, only (van Emden, 1942: 45-46).

#### KEY TO GENERA OF NEOTROPICAL AND NORTHERN MEXICAN PANAGAEINI (ADULTS)

- 1      Dorsal surface glabrous, smooth, with metallic colors and luster .....  
 ..... *Brachygnathus* Perty, 1830.
- 1'      Dorsal surface pubescent, punctate; color of dorsum uniformly dark, or elytra bicolored black and orange, pronotum either dark or orange.... 2.
- 2    ( 1' )      Head with clypeus narrow, concave, labrum narrow. Mandibles expanded at bases, left mandible with prominent dorso-lateral projection .....  
 ..... *Micrixys* LeConte, 1854.
- 2'      Head normal, clypeus flat. Mandibles normal, left mandible without

- 2' (con't) prominent lateral boss ..... 3.  
 3 ( 2') Terminal labial palpomere elongate, not dilated; terminal maxillary palpomere dilated ..... *Geobius* Dejean, 1831.  
 3' Terminal maxillary and labial palpomeres dilated toward apices ..... 4.  
 4 ( 3') Elytra concolorous, black. Lateral margins of pronotum with long spines ..... *Coptia* Brullé, 1835.  
 4' Elytra bicolored black and orange. Lateral margins of pronotum regularly curved ..... *Panagaeus* Latreille, 1804.

1. *Brachygnathus* Perty, 1830 (=*Eurysoma* Dejean, 1831; =*Eurysoma* Gistl, 1857; =*Eurysomides* Strand, 1916). A South American genus with six species, of which five are recorded from Brazil. For a revision, see Straneo (1951c). The species show marked variation in color, and this has served as the basis for some subspecies and varieties. *Eurysoma splendida* Gistl, 1857 (listed by Blackwelder, 1944: 72 as *incertae sedis*), is probably conspecific with one of the recognized species of *Brachygnathus*.

The inclusion of *Brachygnathus* in the Panagaeini is doubtful. Adults of the genus show some similarities with adult peleciines.

2. *Coptia* Brullé, 1835. This genus includes four species: two described from the Antilles, and two described from mainland localities of the Neotropical Region. Both of the latter are known from Brazil (see Ogueta, 1963a). For a key to the species, see Reichardt (1971a).

The range of one of the mainland species extends from Brazil to northern lowland, tropical Mexico, but there are large distributional gaps. Members of this species, *C. armata* Castelnau, 1832, inhabit palm forests, where adults are found in wet places, under fallen palm fronds. [GEB]

3. *Geobius* Dejean, 1831 (=*Philogeus* Blanchard, 1840). A monobasic genus from Argentina, and listed *incertae sedis* by Blackwelder (1944: 72). The group is certainly related to *Coptia*, as van Emden (1936a: 48, note k) and earlier authors stated.

4. *Panagaeus* (*sensu lato*) Latreille, 1804. This is essentially a Holarctic genus, with six Palaearctic species (subgenus *Panagaeus*, *sensu stricto*) and six described from the Americas (subgenus *Hologaeus* Ogueta, 1966). Of the described species of subgenus *Hologaeus*, three are known from United States; one from the Antilles; Mexico has two species (one shared with southwestern United States, one with the Antilles); and one species, *P. panamensis* Laferté, 1851, is known from Panama and Ecuador. One undescribed species is known from southeastern Texas and Chiapas, Mexico. Members of these species occur in open areas, such as open woodlands, natural grasslands, and pastures. [GEB]

[5. *Micrixys* LeConte, 1854. Two species are included: *M. distinctus* Haldeman, 1852, ranging from southern United States (Texas-Arizona) southward to the Mexican Plateau to Aguascalientes, and *M. mexicanus* Van Dyke, 1927, known only from the Pacific coast of Mexico (type locality "Venedio" (=Venedillo), Sinaloa). They seem to be adapted to dry, open areas, for specimens of *M. distinctus* were collected in grassland, in southern Arizona. Although the group is not known from the Neotropical Region, *M. mexicanus* is at the northern fringe of this area, and probably ranges into it.] [GEB]

#### Tribe Morionini

A tribe of about 10 genera (Csiki, 1929, 104: 479) of the tropics of the Old and the New Worlds. Most authors have considered the Morionini as a subtribe of Pterostichini (an action even maintained by Straneo, *in litt.*) but more recently it has been considered as a distinct tribe, of uncertain relationships. Whitehead & Ball (1975) discussing relationships of the groups within Pterostichini, exclude Morionini and Catapiesini from the tribe.

As far as known, adults and immatures of Morionini live in fallen logs and adults have well developed wings. Van Emden (1953b, 25: 51-54) described and discussed the presumed larva of *Morion orientale* Dejean, comparing it to a larva which he earlier (1942: 27) had referred to the scaritine genus *Scarites*, subgenus *Distichus*, but in reality was that of *Morion cordatum* Chaudoir, 1837 (cited as *Morion georgiae* Palisot). Reichardt reared the larva of *Morion brasiliense* Dejean, 1825. It is evident that larval characters of the group stress the validity of the tribe. Two genera occur in the New World.

#### KEY TO GENERA OF NEOTROPICAL MORIONINI (ADULTS)

- |    |   |                                      |
|----|---|--------------------------------------|
| 1  | Mentum with bilobed tooth . . . . .   | <i>Morion</i> Latreille, 1810.       |
|    | Mentum with simple tooth . . . . .  | <i>Moriosomus</i> Motschulsky, 1864. |
| 1. | <i>Morion</i> Latreille, 1810 (= <i>Morio auct.</i> ). A genus of worldwide distribution, with seven Neotropical species (one from the Antilles), of which four are recorded from Brazil (revision: Allen, 1968). |                                      |
| 2. | <i>Moriosomus</i> Motschulsky, 1864. Monobasic genus from Central America (Allen, 1968: 151).   |                                      |

#### Tribe Catapiesini

An exclusively Neotropical tribe of obscure relationships. Reichardt (1973b) showed that the group is distinct from Pterostichini, in which it had been previously placed as a subtribe. Whitehead & Ball (1975) agree that these beetles form a distinct tribe.

Adults of a few species have been collected from rotten logs, but larvae are not known. Two genera are known.

#### KEY TO GENERA OF CATAPIESINI (ADULTS)

- |    |   |                                   |
|----|---|-----------------------------------|
| 1  | Body little depressed. Without supraorbital and pronotal setae. Sutural stria not extended to scutellum, and discal striae absent from base in most specimens . . . . .                     | <i>Catapiesis</i> Solier, 1835.   |
| 1' | Body very depressed. Head with posterior supraorbital seta and basal pronotal seta present. Sutural stria extended to scutellum, and all striae complete, from base to apex . . . . .       | <i>Homalomorpha</i> Brullé, 1835. |
| 1. | <i>Catapiesis</i> Solier, 1835 (= <i>Basoleia</i> Westwood, 1835; = <i>Hololissus</i> Mannerheim, 1837). With eight species distributed from Mexico to southern Brazil (three from Brazil). |                                   |
| 2. | <i>Homalomorpha</i> Brullé, 1835 (= <i>Geta</i> Putzeys, 1846). Monobasic, with range extending from Mexico to northern Argentina.  |                                   |

#### Tribe Pterostichini (including Agonini)

The Pterostichini are one of the most diverse and most important groups of Carabidae, with many taxa typically cold-temperate (in South America represented in the southern part of the continent), and others tropical. It seems that Pterostichina are commoner in colder and more temperate climates, being replaced by Agonina and harpalines in the tropics.

The Neotropical fauna is taxonomically difficult. One of the problems is divergence in generic concepts, e.g. the Jeannel (splitting) *versus* the more conservative (lumping) concept. Many monobasic or very small genera have not been properly studied and compared with each other, and their status and systematic position remains unsettled. On the other hand, there are

markedly diverse worldwide genera, like *Pterostichus* and *Colpodes*.

Part of the confusion arises from Csiki's world catalog of Carabidae (Csiki, 1929: 104; 1930: 112; 1931: 115). Several of the groups included in the tribe have already been eliminated from it by subsequent authors. These are:

- (1) The subtribe Morioni (Csiki, 1929: 479-484), at present considered a distinct tribe (see p. 404).
- (2) The subtribes Meonidi (Csiki, 1929: 484), Melisoderi (*idem*: 485-486), Tropidopteri (*ibidem*: 486-491) and Psydri (*ibidem*: 494), are all fused to form the tribe Psydrini (=Nomiini; see p. 394).
- (3) The subtribe Catapiesi (Csiki, 1929: 492-493), is now also considered a distinct tribe (see p. 405).

These groups eliminated, there still remains the bulk of genera in the tribe, and the confusion is great, and it is impossible to present a clear picture of the group at present.

A second problem is arrangement of genera in subgroups, and even limits of the tribe. One of the highly diverse groups related to this tribe is the agonines, which have been accorded very different status by different authors. Csiki (1931: 739) considered them as a subtribe of his Pterostichini, and has been followed by such authorities as Lindroth (1966: 441). Ball (1960: 129) preferred to consider the Agonini as a distinct tribe, but in a more recent paper (Whitehead & Ball, 1975: 595) returned the agonines to Pterostichini, and doing the same with another group normally considered as a distinct tribe (the Lachnophorini). Their action, in relation to the Agonina, was justified by the fact that they fused a genus of true Pterostichini with a genus normally considered agonine (see the subtribe Cyrtolaina).

Lindroth's (1966) arrangement of the Pterostichini is restricted to the Nearctic fauna, not including the several tropical groups. In this work, I follow Whitehead & Ball (1975), but only in part. It does not seem necessary to include the Lachnophorini in Pterostichini as a subtribe, and it seems that at least one group of true Pterostichini, the Chaetogenyina, has not been taken into account by these authors, probably because they were unfamiliar with it. Another problem with the proposed system is that the subtribes are listed, but the genera they should include are not specified. For these reasons, the system used below will not follow exactly Whitehead and Ball, but will also include some information received from S.L. Straneo (*in litt.*, 1975), who at my urging is preparing a revision of the Pterostichini (excluding Agonini) at the generic level. I should, however, say that Straneo is one of the authors intermediate in generic concepts, not a splitter as Jeannel, but neither as conservative as are the more recent anglo-saxon workers.

#### Subtribe Cyrtolaina

A group of Pterostichini erected by Whitehead and Ball (1975: 595) for a single genus. *Cyrtolaus* (*sensu lato*) Bates, 1882, placed by previous workers in Agonina, from wet tropical mountain forests of Guatemala and Mexico. *Ithytolus* Bates, 1884, previously considered a subgenus of *Pterostichus* (*Pterostichina*), is considered by them a subgenus of *Cyrtolaus*. The two subgenera are distinguished by Whitehead & Ball as follows:

#### KEY TO SUBGENERA OF *CYRTOLAUS* (ADULTS)

- 1 Pronotum with anterior marginal bead complete, posterior lateral setae near hind angles. Elytron with well developed plica, epipleuron interrupted (crossed), stria impunctate. Sub-pygidal setae two in male, four in female ..... *Ithytolus* Bates, 1884.

- 1' Pronotum without anterior marginal bead, posterior lateral setae distinctly anterad of hind angles. Elytral epipleuron interrupted or not, striae punctate. Sub-pygidal setae four in male, six to eight in female . . . . . *Cyrtolaus (sensu stricto)*.

1.1. *Ithytolus* Bates, 1884. Includes only *Cyrtolaus (Ithytolus) anomalus* Bates, 1884, only known from Orizaba, Veracruz, Mexico.

1.2. *Cyrtolaus (sensu stricto)*. This subgenus includes eight species, five from Mexico and three from Guatemala.

#### Subtribe Euchroniia

Also a small Neotropical subtribe (which also includes the Australian *Setalis* Castelnau, 1867) of metallic colored adults, some of large size. Four genera are currently placed in this subtribe. A fifth genus, *Haplobothynus* Tschitscherine, 1901, usually placed here, according to Straneo (*in litt.*) belongs in the Pterostichina.

2. *Dyschromus* Chaudoir, 1835. Restricted to Mexico (five species) and the Antilles (five species).

3. *Lobobrachus* Sharp, 1885. Two very closely related species in Brazil (see Tschitscherine, 1901).

4. *Euchroa* Brulle, 1834. Includes four species, two from Brazil, one from Argentina and one from Uruguay.

5. *Bothynoprocus* Tschitscherine, 1901. With two species, one in Brazil (Mato Grosso) and one in Paraguay. Straneo (1941), who described the Paraguayan species, gives a better definition of the genus.

#### [Subtribe Stomina

A subtribe which includes the single, Palaearctic genus *Stomis* Clairville, 1806, with one species introduced in the United States (see Lindroth, 1966: 442; Whitehead & Ball, 1975: 595). Catalogs (Csiki, 1929: 502; Blackwelder, 1944: 34) list the Mexican *Stomis granulatus* Say, 1834. This species must remain *incertae sedis* until studied.]

#### Subtribe Cratocerina

A monogeneric Neotropical group with two species described in the genus *Cratocerus* Dejean, 1829. One is known from Mexico, Paraguay and Brazil, the other from Venezuela, Paraguay and Brazil. Five species, three of them undescribed, are known to occur in Central America [TLE].

The species apparently live in rotten wood, as do members of Catapiesini and Morionini. Van Emden (1942: 65) described the larva of a species of *Cratocerus* (probably *C. sulcatus* Chaudoir, 1852), collected from a rotten banana stump.

#### Subtribe Tichoniina (=Microcephalina)

Also a monogeneric subtribe, restricted to South America. Its relationships have not yet been settled. Jeannel (1949: 849) placed the pterostichine genus *Tichonilla* in a subfamily Tichoniitae of his Panagaeidae, together with *Brachygnathus* (see Panagaeini, p. 403). As discussed above, the systematic position of *Brachygnathus* in Panagaeini is not yet settled, but it seems certain that it is not related to *Tichonilla*.

8. *Tichonilla* Strand, 1942 (=*Microcephalus* Dejean, 1828, *nec* Latreille, 1827; =*Cynthia* Latreille, 1829, *nec* Fabricius, 1807; =*Microcarenus* Tschitscherine, 1903, *nec* Bergroth, 1895; =*Caletor* Tschitscherine, 1903, *nec* Loman, 1893; =*Tichonia* Semenov, 1904, *nec* Huebner,

1826). Probably the most complicated genus in homonymy (at least in Carabidae), with a total of 15 South American species, 10 of which are recorded from Brazil. A key to species described until 1900 is presented by Tschitscherine (1900: 452; see also van Emden, 1958: 24).

#### Subtribe Chaetogenyina

A monogenetic South American subtribe described by van Emden (1958: 24) for *Chaetogenys* van Emden, 1958. Négre (1966) included a second genus, *Camptotoma* Reiche, 1833, placed in the Lachnophori of Csiki (1931, 115: 889). Straneo (*in litt.*) considers a single genus, with two subgenera.

The spongy pubescence of the male front tarsomeres renders it doubtful that chaetogenyines are really pterostichines. The group should probably be ranked as an independent tribe. It may be a remnant of the plesiotypic and at this time, unknown and unhypothesized, sister group of Pterostichini, or the two extant groups may not be directly related.

As van Emden (1958) noted, the brush of long setae behind the labium on the ventral surface of the head of an adult chaetogenyine is reminiscent of the collembolan-feeding *Leistus* adults (and also of *Loricera* Adults). Additionally, adults of the subgenus *Chaetogenys* have markedly elongate setae on the basal antennomeres, reminiscent of *Loricera* antennae. (These very long setae, presaged by the moderately long setae of the antennae of *Camptotoma*, suggest that chaetogenyines are also feeders on small, agile arthropods, using the array of large setae as a small corral in which to trap their prey. [GEB]

#### KEY TO SUBGENERA OF *CAMPTOTOMA* REICHE, 1843 (ADULTS)

- |    |   |
|----|---|
| 1  | Two pairs of supraorbital and two pairs of pronotal setae . . . . .               |
|    | ..... <i>Chaetogenys</i> van Emden, 1958.   |
| 1' | A single pair of supraorbital and only posterior pair of pronotal setae . . . . . |
|    | ..... <i>Camptotoma</i> ( <i>sensu stricto</i> ). . . . .                         |

9.1. *Camptotoma* (*sensu stricto*). This group includes three species: one from Colombia and two from Venezuela (key to species in Négre, 1966: 690).

9.2. *Chaetogenys* van Emden, 1958. Described as a monobasic genus for a species from Paraguay and Brazil (Mato Grosso), now the subgenus also includes *flavostriata* (Reichardt, 1967), from Brazil (Minas Gerais), mistakenly described as *Camptotoma* (Reichardt, 1967b: 73-74).

#### Subtribe Pterostichina

The subtribe which includes most genera and species of Pterostichini is taxonomically complex, and is not understood. One of the great problems is the highly diverse, worldwide genus *Pterostichus* Bonelli, 1810, with many subgenera (frequently considered genera, e.g. by Straneo, *in litt.*, who considers some of the Neotropical subgenera as genera, and excludes *Pterostichus* from the Neotropical Region). The following genera and subgenera are included:

10. *Adrimus* Bates, 1872. A genus with 10 species, of which seven are from Brazil (mostly from the Amazon Basin), and one species from Guatemala.

11. *Loxandrus* LeConte, 1852 (=*Megalostylus* Chaudoir, 1843, *nec* Schoenherr, 1840). A Nearctic-Neotropical genus, represented also in Australia (see Lindroth, 1966: 537). In the Neotropical Region are 77 described species, predominantly South American (34 known from Brazil). Allen (1973) revised the North American and Mexican species.

12. *Metoncidus* Bates, 1870. Monobasic, from Brazilian Amazonia.

13. *Oxycrepis* Reiche, 1843. A Neotropical genus with only one species in Mexico and one in Texas. In South America there are 17 species, of which 10 occur in Brazil. *Stolonis* Motschulsky,

1865 has usually been considered congeneric, but van Emden (1949: 861) considers it a subgenus, Mateu (1976) a genus.

14. *Prostolonus* Mateu, 1976b. Monobasic, from Venezuela.
15. *Meropalpus* Tschitscherine, 1900. With one Bolivian and two Brazilian species.
16. *Marsyas* Putzeys, 1846. A South American genus with nine species, of which seven are known from Brazil.
17. *Haplobothynus* Tschitscherine, 1901. A Brazilian genus with two species, which has usually been placed among the Euchroina (p. 407).
18. *Oribazus* Chaudoir, 1874 (=*Oribas* Dohrn, 1875; =*Oribasus* Dohrn, 1875). A genus from Northern South America, with two species, known from Colombia and Venezuela. Reichardt (1971a: 76) illustrated and redescribed *Oribazus catenulatus* Chaudoir, 1874, from Venezuela.
19. *Apsaustodon* Tschitscherine, 1901. A monobasic genus from northern South America (Venezuela).
20. *Eumara* Tschitscherine, 1901. With one species in Uruguay, one in Brazil and one in Argentina (key to species in Straneo, 1967: 3).
21. *Pachythecus* Chaudoir, 1874. Monobasic, from Brazil.
22. *Cynthidia* (*sensu lato*) Chaudoir, 1873. A South American genus, composed of two subgenera, which are distinguished as follows (according to Straneo, 1951d).

#### KEY TO SPECIES OF *CYNTHIDIA* (ADULTS)

- |    |                               |                                       |
|----|-------------------------------|---------------------------------------|
| 1  | Labrum metallic . . . . .     | <i>Cynthidia</i> s. str..             |
| 1' | Labrum not metallic . . . . . | <i>Pseudocynthidia</i> Straneo, 1951. |
- 22.1. *Cynthidia* s. str., includes a total of six South American species (of which five are recorded from Brazil). Key to species in Straneo (1951b: 17).
- 22.2. *Pseudocynthidia* Straneo, 1951. Monobasic, occurring in Bolivia and Argentina.
23. *Abaridius* Chaudoir, 1873. Monobasic, from Brazil.
24. *Abaris* Dejean, 1831 (=*Abarys* Gemminger & Harold, 1868). A Neotropical genus which extends from Mexico to Brazil, with most species distributed in northern South America. It includes eight species, four of which are known from Brazil.
25. *Pseudabarrys* Chaudoir, 1873 (=*Pseudabarbis* Csiki, 1930). Included are two Mexican and five South American species (three of which are known from Brazil).
26. *Pachybaris* Straneo, 1951. Described for five Colombian species, with a key to species.
27. *Feroniola* Tschitscherine, 1900. A genus with disjunct distribution, occurring in the southern extreme of the continent in Bolivia, and in the area around Buenos Aires (see Straneo, 1969a). There are seven known species.
28. *Sierrobius* Straneo, 1951. A genus from the Andean Colombia. According to Straneo (1951b: 58) it could probably be considered as a subgenus of *Pterostichus*; Straneo presents a key to the species.
29. *Percolaus* Bates, 1882. A genus with a described species from Guatemala, and two undescribed species from Guatemala and another from the central highlands of Chiapas. [GEB]
30. *Pterostichus* (*sensu lato*) Bonelli, 1810 (=*Platysma* Bonelli, 1810; =*Feronia* Latreille, 1817). See Lindroth (1966: 446, note 1), with reference to the nomenclature of the genus. *Pterostichus* is a worldwide genus, whose species are arranged in several decades of subgenera of still doubtful validity. The following have Neotropical representatives:
- 30.1. *Hyphernes* Chaudoir, 1838 (=*Haplocoelus* Chaudoir, 1838; =*Brachystilus* Chaudoir, 1838; =*Gonoderus* Motschulsky, 1859). A Nearctic subgenus, with three species in the highlands of Mexico.
- 30.2. *Allotriopus* Bates, 1882 (=*Pristoscelis* Chaudoir, 1878, nec LeConte, 1862). With one Japanese species and several in Mexico and Guatemala.

30.3. *Blennidus* Motschulsky, 1865. A South American subgenus with 12 species, which occur especially in the Andean and Chilean areas, but one is also known from southern Brazil. Straneo (1954: 96-97) published a key to the known species, and considered *Blennidus* a subgenus of *Trirammatus* (see below, 30.5.).

30.4. *Plagioplatys* Tschitscherine, 1900. Also included in *Trirammatus* by Straneo (1954: 96), this subgenus includes three species from Argentina and Chile.

30.5. *Trirammatus* Chaudoir, 1838. Considered here as a subgenus of *Pterostichus*, it includes three species, which occur in Chile, Argentina and southern Brazil. Straneo (1954: 96, 99) considers *Trirammatus* a genus, including *Blennidus*, *Ogmopleura* and *Plagioplatys* as subgenera.

30.6. *Argutoridius* Chaudoir, 1876. A South American subgenus, considered a distinct genus by Straneo (1969b), who published a revision. It includes eight species (with several subspecies), with distribution ranging from Chile, Bolivia, Argentina and Uruguay to southern Brazil.

30.7. *Ogmopleura* Tschitscherine, 1898. A South American subgenus, especially from Chile and Peru, but also with species in Uruguay and Argentina, and one in southern Brazil. A total of 28 species are included. Straneo (1954: 96, 99) considers *Ogmopleura* a subgenus of *Trirammatus*.

30.8. *Agraphoderes* Bates, 1891. A subgenus described to include four species from the Ecuadorian Andes. In a recent revision Straneo (1971) described two more species, also from Ecuador.

30.9. *Ophryogaster* Chaudoir, 1878. A subgenus with two Mexican species, one in Colombia, one in Ecuador and one in Bolivia. Straneo, who described the Bolivian species, considered *Ophryogaster* a distinct genus (1958b).

30.10. *Feroniomorpha* Solier, 1849 (=*Pachymorphus* Chaudoir, 1838, nec *Pachymorpha* Hope, 1838; =*Nortes* Motschulsky, 1865). With 11 Chilean, Argentinian and Uruguayan species. One species of *Feroniomorpha* also occurs in southern Brazil.

30.11. *Meraulax* Tschitscherine, 1900. With two species in Argentina.

30.12. *Paranortes* Tschitscherine, 1900. A monobasic subgenus which occurs in Argentina, Uruguay and southern Brazil.

30.13. *Eutany* Tschitscherine, 1900. With two species, restricted to Chile.

30.14. *Antarctobium* Tschitscherine, 1900. A monobasic subgenus from Magallanes, southern Chile.

30.15. *Chaetauchenium* Tschitscherine, 1900. A monobasic subgenus from Chile.

30.16. *Parhypates* Motschulsky, 1865. With six Chilean species.

30.17. *Poecilus* Bonelli, 1810. A Holarctic subgenus (with extensive synonymy), of which five species occur in Mexico.

30.18. *Hybothecus* Chaudoir, 1874. A monobasic subgenus from Colombia.

30.19. *Bothriopterus* Chaudoir, 1838. A Holarctic subgenus, with one species in the highlands of Mexico.

30.20. *Anaferonia* Casey, 1918. A Nearctic subgenus (included in *Evarthrus* LeConte by Freitag, 1969), with one species in northern Mexico.

30.21. *Cyclotrachelus* Chaudoir, 1838. Also a Nearctic subgenus, with one North American species which extends into Mexico, and a second species endemic in Mexico. (This group was also included in *Evarthrus* by Freitag.)

Seven South American species of *Pterostichus* (of which two occur in Brazil), are considered "incertae sedis" in this system.

#### Subtribe Antarctiina (=Metiini)

A relatively diverse subtribe, restricted to the southern part of South America, predominant in Chile extending to Peru along the Andes, and penetrating eastward into Argentina, Uruguay and southern Brazil (Santa Catarina).

Classification of the group was straightened out in Straneo's revision (1951a). Resurrecting *Metius* Curtis, 1839 from synonymy, however, Straneo changed the subtribe name from *Antarctiina* to *Metiina*. However, according to article 40 of the "International Code of Zoolo-  
gical Nomenclature", 1964, this change was unnecessary (see also *Tichoniina* and *Cnemacanthini*).

Straneo (1963) described the monobasic genus *Kushelinus* from San Ambrosio Island (900 km off the Chilean coast), which even though of uncertain position, most probably belongs in this subtribe.

#### KEY TO GENERA OF ANTARCTIINA (ADULTS)

(adapted from Straneo, 1951a, 1963)

1 Femur with series of setae on hind and front margins ..... 2.

- 1' Femur with one or two setae on ventral margin. Abdominal sterna III-V with one seta on each side ..... 3.
- 2 (1) Penultimate labial palpomere with series of setae ..... *Kuschelinus* Straneo, 1963.
- 2' Penultimate labial palpomere glabrous. Front tibia with series of spines along external margin. Abdominal sterna III-V with series of setae ..... *Antarctiola* Straneo, 1951.
- 3 (1') Tarsomere 4 not bilobed ..... *Metius* Curtis, 1839.
- 3' Tarsomere 4 deeply bilobed ..... *Abropus* Waterhouse, 1842.

31. *Metius* Curtis, 1839 (=*Antarctia* Dejean, 1828, not Huebner, 1820; =*Tachycelia* Gistl, 1848). The most diverse of the genera of the subtribe, with 62 species, of which only two are known from southern Brazil (especially Santa Catarina, but there is also a record from Rio de Janeiro, Nova Friburgo). Originally revised by Putzeys (1873), the genus was restudied by Straneo (1951), who described several of the species. Straneo (1969a) doubts that *M. isthmicus* (Panama), *M. nigrita* and *M. picipes* (Venezuela), three species described by Motschulsky (1865) as *Metius*, really belong to this genus, even suggesting that they are Harpalini, near *Notiobia*.

32. *Abropus* Waterhouse, 1842 (=*Habropus* auct.). Monobasic, from the Magallanes area in southern Chile, very closely related to *Metius*. The genus has a complex nomenclature because *Antarctia carnifex* Dejean, 1828 was declared conspecific with *Abropus carnifex* (Fabricius, 1775). The two are, however, distinct species (see Straneo, 1951a: 86; 1969a; 966-967).

33. *Antarctiola* Straneo, 1951. A genus described for two Patagonian species, and which should possibly also include *Metius motschulskyi* Csiki, 1931 and *M. amarioides* Motschulsky, 1865.

34. *Kuschelinus* Straneo, 1963. Monobasic, from San Ambrosio Islands.

#### [Subtribe Synuchina

Whitehead & Ball (1975) consider a subtribe Synuchina to include *Synuchus* Gyllenhal, 1810 (=*Pristodactyla* Dejean, 1828). The group is Holarctic with many species. The genus *Synuchus* was most recently studied by Lindroth (1956). Only one species occurs in Mexico, *Synuchus semirufa* Casey, 1913.]

#### Subtribe Agonini (=Anchomenia; =Platynina)

A markedly diverse group of predominantly temperate distribution. As discussed above, some authors prefer to consider the Agonina as a tribe distinct from the Pterostichini, but recent studies seem to stress the relationships of the two groups, and they must be considered as members of the same tribe.

Whitehead & Ball (1975), considering the agonines as a subtribe of Pterostichini, separate the Agonini (in the old sense) in three subtribes, the Agonina, Sphodrina and Pristosiina. The Sphodrina include mainly troglobites, and is restricted to the Holarctic Region and New Zealand. Barr originally described the genus *Mexisphodrus* (1965, 19) as a Neotropical representative of the Sphodrina, but later concluded that the genus is better placed among the true Agonina (1970, 1977).

The Agonina have numerous tropical representatives. The group is not well understood, and only in a few recent papers Whitehead started to settle the status of the Mexican (and other Neotropical) species. The tropical species are very poorly known. It seems more logical to present the genera below in two parts, first those with typically temperate relationships, with a large number of species in Mexico, and in the second part the few genera apparently endemic

to South America.

Immature stages of Neotropical species are unknown.

35. *Platynus (sensu lato)* Bonelli, 1809. Whitehead (1973) studied the Mexican species formerly placed in *Colpodes* and *Agonum* (as well as in other smaller genera), and resurrected *Platynus* Bonelli from synonymy with *Agonum* Bonelli, 1810 for them. Nonetheless, classification of Mexican *Platynus* is far from settled, and much less that of other Neotropical species; according to Whitehead (*l.c.*: 214) there are more than 100 undescribed species from Mexico alone, and the subdivision of the genus is provisory. The following subgenera are considered as valid by Whitehead:

- 35.1. *Stenocnemus* Mannerheim, 1837. A monobasic group which was usually considered congeneric with *Colpodes*.
- 35.2. *Trapezodera* Casey, 1920. Also resurrected from synonymy with *Colpodes*; includes a single Mexican species.
- 35.3. *Platynella* Casey, 1920 (=*Bolivariidius* Straneo, 1957). Originally described as a "sectio" of the subgenus *Hemiplatynus* Casey, 1920. Whitehead included three Mexican species in *Platynella*, considering it a subgenus. Barr (1970) studied the three species, and synonymized Straneo's name for it.
- 35.4. *Hemiplatynus* Casey, 1920. Originally described as a subgenus of *Agonum*. In the sense of Whitehead it includes a single Mexican species.
- 35.5. *Stenoplatynus* Casey, 1920. Also described as a "sectio" of *Hemiplatynus*. Whitehead considered it a valid subgenus, with a single species.
- 35.6. *Rhadine* LeConte, 1848. Originally considered a subgenus of *Agonum*; also considered a valid genus by several authors. It is a widely distributed group in the United States; seven species are known from Mexico.
- 35.7. *Mexisphodrus* Barr, 1965. A genus described for a Mexican species (and originally considered the first Neotropical Sphodrina (see p. 411). Other species were later added (Barr, 1966), but are not congeneric. Whitehead considered *Mexisphodrus* a monobasic subgenus of *Platynus*.

The remaining 112 Mexican species of *Platynus* have not been placed in subgenera by Whitehead. A few of these reach northern South America. The South and Central American species are badly in need of a revision, to know where they are to be placed. As it is impossible to solve this problem now, they are only mentioned below in the genera in which they are cited in catalogs (Csiki, 1931: 745 ff).

*Colpodes* MacLeay, 1825. According to Whitehead, this genus does not occur in the Neotropical Region. This is a markedly diverse genus with many subgenera in other faunas. Eliminating the species already allocated by Whitehead (1973, 1974), about 150 species from Central America [TLE], slightly more than 95 from South America (including two from Chile) and a few more than 50 from the Antilles, or a total of nearly 300 species, remain in this complex. It is extremely interesting that of the 95 South American species only seven are known from Brazil; most have been described from Colombia and Ecuador.

*Agonum* Bonelli, 1809. Also a highly diverse, cosmopolitan genus, predominantly in temperate areas. Possibly it is not in the Neotropical Region; subgenera and species groups are numerous in other faunas. Excluding *Rhadine*, *Hemiplatynus*, *Stenoplatynus* and *Platynella* (see *Platynus*, p. 412) from *Agonum*, there remain only species placed in *Agonum (sensu stricto)*: five evidently Nearctic species which reach into Mexico and the Antilles, as well as 37 species which occur in Mexico (nine) and the Antilles (one), as also in South America-Chile (nine), tropical parts (18), of the latter six in Brazil. Of the subgenus *Anchomenus* Bonelli, 1809 (also a predominantly temperate group), there are four Nearctic species which penetrate into Mexico and the Antilles, three exclusively Mexican and two from Colombia.

36. *Sericoda* Kirby, 1837. With five species, four of which occur in North America, and one of these, *S. bembidioides* Kirby, 1837, ranges from subarctic areas to South America. The species are associated with burnt wood, and adults fly to and in the vicinity of forest fires (Lindroth, 1966: 565). In Mexico and Guatemala, specimens have been collected in forests at high elevation (2800-3000 meters). [GEB]

37. *Speocolpodes* Barr, 1974. Recently described for a cavernicolous species from Guatemala (Barr, 1974), this genus was not included in Whitehead's study. Its status as a distinct genus

must be considered provisory. This genus is the southernmost record of a troglobitic agonine in the New World.

38. *Onypterygia* Dejean, 1831 (=*Onychopterygia* Gemminger & Harold, 1868). A genus with predominance of species in Mexico and Guatemala, but one of them occurs over the whole of Central America, and one is only known from Panama. There are 19 valid species. According to Whitehead, it is a valid genus, characterized by pectinate claws.

39. *Calathus* Bonelli, 1810. A moderately diverse, Holarctic genus, which was re-structured by Lindroth (1956). Ball & Nègre (1972), in a revision of the Nearctic species, recognized two subgenera to include the Mexican species.

39.1. *Tachalus* Ball & Nègre, 1972. A monobasic subgenus for *Calathus ovipennis* Putzeys, 1873, which is exclusively known from Oaxaca in Mexico.

39.2. *Neocalathus* Ball & Nègre, 1972. Erected for the remaining Nearctic species, of which 12 occur in Mexico, with very restricted distribution at higher altitudes.

40. *Pristonychus* Dejean, 1828. Cosmopolitan genus. One cosmopolitan species, *P. complanatus* Dejean, 1828 (representing subgenus *Laemosthenes* Schaufuss, 1865), has been recorded from Chile, Peru and the United States.

41. *Elliptoleus* Bates, 1882. A genus with six Mexican species. Considered valid by Whitehead (l.c.).

42. *Glyptolenus* Bates, 1878 (=*Glyptoglenus* Bertkau, 1878). Originally a predominantly Central American genus, *Glyptolenus* was recently studied by Whitehead (1974), who included in it several species formerly placed in *Colpodes*, and which thus now includes 17 species, predominantly South American, of which six are recorded from Brazil, one from Jamaica and two from the Lesser Antilles.

43. *Olisares* Motschulsky, 1864. Monobasic from Venezuela.

44. *Amphitonus* Bates, 1871. A monobasic genus from Amazonas. A second species which Bates included in the genus, was transferred by van Emden (1949) to *Oxycrepis* (p. 408).

45. *Stenocheila* Castelnau, 1832 (=*Diplacanthogaster* Liebke, 1932). With two South American species, both from Brazil. The genus was studied by Reichardt (1968b), who considered Liebke's generic name a junior synonym. *Stenocheila* and *Plaumannium* were originally included by Liebke in his *Colliurini* (1930), but there is no doubt that they are Agonina.

46. *Anchonoderus* Reiche, 1843. With 24 Neotropical species, of which only five are known from Brazil. Its systematic position has also been discussed by a variety of authors. Until recently it was included together with *Lachnophorus* in a subtribe of Agonini (Csiki, 1931, 115: 888).

47. *Plaumannium* Liebke, 1939. Monobasic, from southern Brazil and Argentina.

#### Tribe Lachnophorini

A weakly characterized tribe of still uncertain position and constitution. Several of its genera were included in *Colliurini* by Liebke (1938). Jeannel (1942a: 577) included Lachnophorini, together with Anchonoderini, both as subfamilies, in Perigonidae. Later (1948: 742) he erected the family Lachnophoridae for the two subfamilies. For his Lachnophoritae Jeannel erected two tribes, Lachnophorini and Selinini, based on misinterpretation of the terminal article of the maxillary palpus, as discussed by Reichardt (1975).

Ball (1960: 136, 137) considered Anchonoderini and Lachnophorini distinct tribes. Lindroth (1968: 648) united Anchonoderini and Agonini, retaining them as a subtribe of Pterostichini, and considered Lachnophorini as a distinct tribe (Lindroth, 1969b: xxii). Whitehead & Ball (1975: 595) considered Lachnophorina a subtribe of Pterostichini (see p. 406).

Immature stages of Neotropical species are unknown; most species are riparian, living on river beaches, and others live in clearings in upland forests [TLE]. Adults seem to be good

flyers, and are frequently collected at light.

KEY TO GENERA AND SUBGENERA OF NEOTROPICAL  
LACHNOPHORINI (ADULTS)

- 1 Elytron glabrous, unstriated, castaneous, with yellow markings .....  
..... *Asklepia* Liebke, 1938.
- 1' Elytron densely pubescent, striate ..... 2.
- 2 Elytron with transverse depression in basal third, and several spots of white scales. Dorsal surface with setae of two colors and sizes: black setae more or less as long as scape and yellow setae more or less as long as pedicel. Terminal article of labial palpus oval, with pointed apex ..... 3.
- Elytron without transverse depression. Dorsal setae short or long. Palpi various ..... 4.
- 3 Head coarsely punctate. Elytra with complete striae, equally punctate from base to apex; design formed by two yellow, transverse bands, anterior band of some specimens extended over basal 0.33. Integument black ..... *Calybe* Castelnau, 1834.
- Head and pronotum smooth. Elytral striae erased behind middle in most specimens. Body brownish, each elytron with three or four white spots ..... *Ega* Castelnau, 1834.
- 4 Integument black. Dorsal setae erect, sparse, some as long as scape. Terminal labial palpomere fusiform ..... *Euphorticus* Horn, 1881.
- Integument pale. Dorsal surface densely pubescent. Setae much shorter than pedicel. Terminal labial palpomere oval with pointed apex ..... *Lachnophorus (sensu lato)* Dejean, 1831 ..... 5.
- 5 Terminal maxillary palpomere flat and abruptly narrowed in apical 0.25 to form short peduncle. Terminal palpomeres finely and densely pubescent, pubescence semi-decumbent ..... *Aretaonus* Liebke, 1936.
- Terminal article of maxillary palpus elongate, in shape of inverted club, thickened at base and narrowed toward apex, truncate or rounded ..... 6.
- 6 Terminal maxillary and labial palpomeres with semi-decumbent pubescence ..... *Lachnophorus (sensu stricto)*.
- Terminal palpomeres glabrous ..... *Axylosius* Liebke, 1936.

1. *Lachnophorus (sensu lato)* Dejean, 1831 (=*Stigmaphorus* Motschulsky, 1862). Liebke (1936) recognized three subgenera, and presented keys to species.

- 1.1. *Lachnophorus s. str.* Nine Neotropical species, of which six are recorded from Brazil.  
1.2. *Aretaonus* Liebke, 1936. Fourteen Neotropical species, one recorded from Brazil.  
1.3. *Axylosius* Liebke, 1936. Eleven Neotropical species, two of which are from Brazil.

Unplaced species: eight Neotropical species, of which two are from Brazil.

2. *Euphorticus* Horn, 1881. The range extends from northwestern South America to southern United States. Three of the species are Neotropical.

3. *Calybe* Castelnau, 1834 (=*Chalybe* Lacordaire, 1854). Seven Neotropical species, of which four are known from Brazil. A key to species is in Liebke (1938: 111); this author included the genus in Colliurini, but there is no doubt that it belongs in this tribe, together with *Ega*. These two genera are treated by some authors as subgenera or a single genus.

4. *Ega* Castelnau, 1834. Seventeen Neotropical species (nine from Brazil). Key to some species in Liebke (1938: 112).

5. *Asklepia* Liebke, 1938. Monobasic, from northern South America (the single species also occurs in Brazil). Reichardt (1974d) described a second species, which is conspecific with *Liotachys antennatus* Bates, 1871 (see p. 11). Nevertheless the genus *Asklepia* is better defined in that paper. A few years after describing *Asklepia*, Liebke described a new genus of Lebiini, *Phaedrusium* Liebke, 1941, with two species, which may well be congeneric with *Asklepia* (or with a genus of Bembidiini).

#### Tribe Amarini

This is a moderately diverse group of ground beetles, whose range is Holarctic. In the Nearctic Region there are two genera: the endemic *Disamara* Lindroth, 1976 (=*Pseudamara* Lindroth, 1968 not Baliani, 1934), including only *D. arenaria* LeConte, 1848; and the Holarctic *Amara* (*sensu lato*) Bonelli, 1809, whose range extends into Middle America. Members of this genus live in dry areas, such as grasslands, pastures and open forests: at low and high elevations in the north; at high elevations only, in the south.

1. *Amara* (*sensu lato*) Bonelli, 1809. Represented in Mexico by two subgenera, one of which ranges into Central America.

#### KEY TO SUBGENERA OF MEXICAN AND NEOTROPICAL *AMARA* (ADULTS)

- |    |  |
|----|--|
| 1  | Pronotum with sides sinuate before hind angles. Body elongate, pterostichoid in appearance . . . . . <i>Curtonotus</i> Stephens, 1828.               |
| 1' | Pronotum with sides not sinuate, broadly rounded, greatest width at or near base; body short, broad . . . . . <i>Amara</i> ( <i>sensu stricto</i> ). |

[1.1. *Curtonotus* Stephens, 1828. The range of this Holarctic subgenus extends south as far as the Trans-Volcanic Sierra, in Mexico. Thus, the group does not enter the Neotropical Region. Four or five closely related species inhabit Mexico, living at higher elevations.]

1.2. *Amara* (*sensu stricto*). Included in this group is the subgenus *Celia* Zimmermann, 1831. The southernmost known locality is the Volcan Irazu, in Costa Rica, where specimens have been collected at elevations of about 1800 to 2100 meters.

This group is very difficult taxonomically. There are probably about a dozen species in Middle America. [GEB]

#### Tribe Perigonini

A tribe of few species included in four genera (Csiki, 1931: 894-899), of which three are Neotropical, and *Perigona* Castelnau, 1835, is worldwide in distribution, with nearly 80 species. Jeannel (1942a: 577) considered the tribe as a subfamily of Perigonidae, together with Anchonoderinae, Omphreinae and Lachnophorinae.

Adults and larvae of *Perigona* live under bark of wet trees at low and middle altitudes. Adults are often attracted to fermenting sap and pulp of pithy tree species (especially certain palms). During dry seasons, adults of *Perigona* and *Diploharpus* are found in deep leaf piles beneath crowns of fallen trees. *Mizotrechus* members are found under deeply embedded stones in cloud forests at middle elevations. [TLE]

#### KEY TO GENERA OF NEOTROPICAL PERIGONINI (ADULTS) (from Jeannel, 1941)

- |   |  |
|---|--|
| 1 | Maxillary palpus thick, penultimate palpomere shorter than terminal, and this fusiform, thickened at base and pointed at apex . . . . . <i>Perigona</i> Castelnau, 1835. |
|---|--|

- 1' Maxillary palpus thin, penultimate palpomere as long or longer than terminal. Terminal article cylindrical-conic. Oculo-frontal sulcus well developed. .... 2.
- 2 (1') Convex specimens head and pronotum narrow, elytra oval. Striae erased ..... *Diploharpus* Chaudoir, 1850.
- 2' Depressed specimens. Striae clearly developed ..... 3.
- 3 (2') Head and pronotum narrow; elytra oval ..... *Aporeshus* Bates, 1871.
- 3' Form elongate and parallel, head and pronotum large ..... *Mizotrechus* Bates, 1872.

1. *Diploharpus* Chaudoir, 1850. Five Amazonian species and three in Central America.

2. *Aporeshus* Bates, 1871. Monobasic from Brazil (Rio de Janeiro), of uncertain taxonomic position. In the original description Bates (1871) mentions similarities (if superficial) with *Diploharpus* but considers it to be related to Odacanthini. Liebke (1930: 657; 1938: 91) also placed the genus in that tribe. Csiki (1931: 895) and Jeannel (1941: 138) placed the genus in Perigonini.

3. *Mizotrechus* Bates, 1872. A monobasic genus from Amazonas, Nicaragua, and Panama. [TLE]

4. *Perigona* Castelnau, 1835. Jeannel (1951) included the Neotropical species (14, distributed from Mexico to Brazil, including the Antilles, and of which 4 are known from Brazil) in *Perigona* s. str., together with other species from the Old World tropics.

#### Tribe Cnemacanthini

A monobasic tribe formed by *Cnemalobus* Guérin, 1839, placed by various authors in Broscini (see p. 395). Jeannel (1941: 286) showed that this genus is not related to the true Broscini. Van Emden (1942: 14) independently reached the same conclusion, but nevertheless described its larva in Broscini (l.c.: 31-32, 64). According to Jeannel the place of the tribe is near the Perigonini (in his system, each of these groups is accorded family status).

1. *Cnemalobus* Guérin, 1839 (=*Cnemacanthus* auct., nec Gray, 1832; =*Odontoscelis* Curtis, 1839, nec Castelnau, 1832; =*Scaritidea* Waterhouse, 1842, nom. nov. for *Odontoscelis* Curtis, =*Scelodontis* Curtis, 1845, nom. nov. for *Odontoscelis* Curtis, 1839).

The nomenclature of this genus is complex, and has not been clearly interpreted. The confusion started when Brullé (1834: 375) described two Chilean species including them in *Cnemacanthus* Gray, 1829, a junior synonym of *Promecoderus* Dejean, 1829 (an Australian genus of Broscini). In 1841 Guérin suggested that the name *Cnemacanthus* should be retained for the Chilean species, with the sense given it by Brullé, in 1834, independently of Gray's genus. This opinion seems to have been accepted, and was followed by all workers and catalogs, reaching the absurd in which Csiki (1928a: 97) cited *Cnemacanthus* Brullé, 1834 as the valid genus for the South American species, and *Cnemacanthus* Gray, 1832, as a synonym of *Promecoderus* Dejean, 1829. It is obvious that in its present usage *Cnemacanthus* Brullé, 1834, cannot be maintained, since even if it had been used for an independent genus (which was not the case), it would be a junior homonym of Gray's name.

Nègre (1973b), in a paper in which he described a new species of *Cnemacanthus*, reached the same conclusion, since the reprint has a mimeographed note attached, reading: "Le nom de Genre de cette espece nouvelle est *Cnemalobus* Brullé et non pas *Cnemacanthus* Gray habituellement attribue par erreur a Guérin".

*Cnemalobus* includes 16 Chilean, one Argentinian and one Bolivian species. There are no recent revisions, and nothing is known about their way of life.

## Tribe Chlaeniini (=Callistini)

A very homogeneous group of Carabidae, frequently united with the Oodini. I prefer to follow Lindroth (1969a: 969), considering them a tribe, especially because the Oodini themselves appear to represent a heterogeneous group. Van Emden (1942: 43-44), who described Old World larvae, considered the Oodina a subtribe of Chlaeniini.

Chlaeniini are widely distributed in the Old World, in tropical and in temperate areas. The taxonomic treatment has varied very much with authors. Chaudoir (1876b) placed most species in *Chlaenius*; recent authors of the “french school” have split the group very much. Basilewsky (1953: 119), considering it a subfamily (as *Callistinae*), reached the extreme of recognizing 10 tribes and numerous genera.

The Neotropical fauna is small, as already mentioned by Chaudoir (1876b: 6–7). The Neotropical species have been neglected; most authors included them in *Chlaenius* Bonelli, 1809, in the subgenera *Chlaenius* (*sensu stricto*) and *Eurydactylus* Laferté, 1851.

## KEY TO SUBGENERA OF NEOTROPICAL *CHLAENIUS* (ADULTS)

- 1 Pronotum with single seta at each posterior angle . . . *Chlaenius (sensu stricto)*.  
 Pronotum with four or more setae along each lateral margin . . . . .  
 . . . . . *Eurydactylus* Laferté, 1851.

1.1. *Eurydactylus* Laferté, 1851 (=*Glyptoderus* Laferté, 1851), apparently restricted to the New World, with a single species, *Chlaenius menevillei* Chaudoir, 1876, recorded from Panama and Bolivia.

1.2. *Chlaenius (sensu stricto)* (with numerous synonyms in other faunas). Includes 19 South American species, of which six are known from Brazil. Grundmann (1955: 282) erected the subgenus *Pachychlaenius* for Nearctic species, and also placed in it *Chlaenius fallax* (Olivier, 1795) from French Guiana. I prefer to keep this species in *Chlaenius (s. str.)*, following Bell (1960: 108), who included in it all species Grundmann assigned to *Pachychlaenius*.

Jedlicka (1946: 13-14) presented a key to some of the species of *Chlaenius* s. str. from the Neotropical Region, in spite of the title of the paper.

## Tribe Oodini

A moderately divergent tribe, but with few species, distributed mostly in temperate zones of the World; but also occurring in the tropics in both Old and New Worlds. The Oodini have frequently been united with the preceding tribe, Chlaeniini (e.g. Ball, 1960: 151). Considering, however, the heterogeneity within the Oodini, it seems more realistic to consider it as an independent tribe. As Lindroth (1969a: 995) writes, “there is no doubt, confirmed also on larval characters, that this group is related to Chlaeniini . . .”, and considers the group a distinct tribe, as has also been done by Erwin (1974b: 184) for exotic Oodini.

Sloane (1923b) erected a tribe for the dercylines. Jeannel (1948: 626) erected a distinct family, the Dercylidae, composed of two subfamilies, Melanchitonitae (a western gondwanian group) and Dercylitae, exclusively Neotropical. The remaining Oodini were placed by the same author (1949: 828) in Callistidae (=Chlaeniini), as a distinct subfamily. No doubt there are two distinct groups within the Oodini, but for the moment, it seems appropriate to consider them as subtribes of the same tribe.

At the generic and species level the “Ooides” were monographed in a posthumous work of Chaudoir (1882), who, unfortunately, did not include keys to genera, but only characterized them, and placed the species in different groupings.

Very little is known about the Neotropical species of Oodini. Members of the tribe live in swamps and marshes, along water courses, and on the forest floor, in leaf litter, in the lowlands. Larvae are known for the few exotic species (van Emden, 1942: 43-44).

## KEY TO SUBTRIBES OF NEOTROPICAL OODINI (ADULTS)

- 1 Pronotum without setae near lateral margins ..... *Oodina*.  
 1' Pronotum with one or two pairs of marginal setae ..... *Dercylina*.

Subtribe Oodina<sup>1</sup>

A predominantly Nearctic subtribe in the Western Hemisphere, with species in Mexico, Central America, the Antilles, and a few in Brazil.

KEY TO GENERA AND SUBGENERA OF NEOTROPICAL OODINA (ADULTS)<sup>1</sup>

- 1 Clypeus with pair of setigerous punctures antero-laterally ..... 2.  
 1' Clypeus without setigerous punctures ..... 4.  
 2 ( 2 ) Labrum with three setae along anterior margin .....  
       ..... *Anatrichis*, subgenus *Oodinus* Motschulsky, 1864.  
 2' Labrum with six (or five) setae along anterior margin ..... 3.  
 3 ( 2' ) Elytron with interval 8 extended as carina into apico-marginal groove;  
       terminal umbilical punctures isolated from more basal punctures by  
       interval 8. Head with occiput markedly iridescent behind eyes. Pronotum  
       sub-rectangular, sides anteriorly not markedly sloped mediad, evenly  
       rounded or slightly sinuate posteriorly ..... *Macroprotus* Chaudoir, 1882.  
 3' Elytron with interval 8 not extended as carina into apical marginal  
       groove; umbilical series not interrupted. Occiput not iridescent. Prono-  
       tum anteriorly with sides sloped markedly mediad ..... *Oodes* Bonelli, 1809.  
 4 ( 1' ) Labrum with six setae along anterior margin. Size small, length of body  
       ca. 7.0 mm ..... *Anatrichis (sensu stricto)* LeConte, 1853.  
 4' Labrum with three setae along anterior margin. Size various, but length  
       of body not less than 9.0 mm ..... 5.  
 5 ( 4' ) Elytron with striae normally developed, punctate, slightly deepened  
       before termination in obliquely transverse position of interval 8; stria  
       7 extended to marginal groove. Color black. Size larger, length of body  
       ca. 18.0 - 25.0 mm ..... *Polychaetus* Chaudoir, 1882.  
 5' Elytron with striae not extended to transversely oblique portion of  
       interval 8; stria 7 not extended to marginal groove. Color various.  
       Size moderate, ca. 10.0 - 15.0 mm ..... 6.  
 6 ( 5' ) Elytron with transverse microsculpture, surface subiridescent; stria 7  
       as deep as 1-6 ..... *Chaetocrepis* Chaudoir, 1882.  
 6' Elytron with isodiametric microsculpture, surface dull or shining, but  
       not sub-iridescent; stria 7 obsolete, or shallower than 1-6 .....  
       ..... *Stenocrepis (sensu lato)* Chaudoir, 1857 ..... 7.  
 7 ( 6' ) Tibiae and tarsi testaceous, remainder of body piceous. Dorsal surface  
       metallic ..... *Stenous* Chaudoir, 1857.  
 7' Legs completely dark ..... 8.  
 8 ( 7' ) Dorsal surface black. Tarsomere 4 of male front tarsus without adhesive  
       vestiture ..... *Crossocrepis* Chaudoir, 1857.  
 8' Dorsal surface olivaceous. Tarsomere 4 of male front tarsus with  
       adhesive vestiture ..... *Stenocrepis (sensu stricto)*.

1. [GEB]

1. *Anatrichis (sensu lato)* LeConte, 1853. This genus includes seven Neotropical species, whose range extends from Brazil to northern Mexico. The species are arrayed in two subgenera, at present. Possibly, these groups should be ranked as genera.

1.1. *Anatrichis (sensu stricto)*. One Neotropical species is included in this group: *A. longula* Bates, 1882. Members inhabit forest swamps, living in wet leaf litter that is either partly submerged, or is right near the water's edge. The species is known from Middle America only. [GEB]

1.2. *Oodinus* Motschulsky, 1864 (= *Oodiellus* Chaudoir, 1882). Four Neotropical species are included in this subgenus, and their collective range includes both Middle America and South America. In Mexico, members of this subgenus occur in the same habitats as those occupied by members of the subgenus *Anatrichis*. Five species are represented in the Neotropical Region.

2. *Macroprotus* Chaudoir, 1882. This genus includes only two species, described from Brazil. Specimens resemble those of *Anatrichis (sensu stricto)* in body form, but are much larger. [GEB]

3. *Oodes* Bonelli, 1809. This is a moderately diverse genus, with species in most zoogeographic regions. The New World fauna is small: three species in the United States, and possibly three in the Neotropical Region, one of which was described from Brazilian material.

4. *Polychaetus* Chaudoir, 1882. Two species are included in this genus: one from Mexico (*P. dejani* Chaudoir, 1882), and one from Guiana (*P. egregius* Chaudoir, 1854). Specimens of *P. dejani* were collected by treading in a *Sagittaria* bed, at Lake Catemaco, Veracruz, Mexico. [GEB]

5. *Chaetocrepis* Chaudoir, 1882. This is a monobasic genus, known from Brazil. The differences between the characteristics of this group and of *Stenocrepis* Chaudoir are so slight and few that it might be best to regard the two as congeneric. [GEB]

6. *Stenocrepis (sensu lato)* Chaudoir, 1857. This is a moderately diverse temperate-tropical New World endemic genus, with Nearctic, Middle and South American species. Members are associated with streams as well as with marshes in open areas. The species are arranged in three subgenera.

6.1. *Stenocrepis (sensu stricto)*. This subgenus includes 16 Neotropical species which range from Mexico and the Antilles to Brazil (eight species in the last-named country).

6.2. *Stenous* Chaudoir, 1857. The distribution pattern is similar to that of *Stenocrepis*, with 12 species, and six from Brazil.

6.3. *Crossocrepis* Chaudoir, 1857. This subgenus includes two species: one in Mexico, and one in the Antilles. [GEB]

#### Subtribe Dercylina

Two genera are included. This is a subtribe with a South American center of maximum diversity. Adults of most species are brachypterous, with reduced metathoraces. No species is known from the Antilles.

#### KEY TO GENERA AND SUBGENERA OF DERCYLINA (ADULTS)<sup>1</sup>

- 1 Elytron with intervals in apical 0.20 tuberculate, catenate or not toward base; interval 1 extended to apex; interval 7 carinate in apical 0.20, extended apically only to apex of interval 2, interval 8 carinulate pre-apically, near termination in interval 7. Hind tibia with posterior surface smooth. . . . . *Physomerus* Chaudoir, 1882.
- 1' Elytron with intervals smooth, not tuberculate or catenate; interval 7 carinate or not, extended obliquely across apical part of elytron to suture; intervals 1-6 not extended to apex, terminated in oblique portion of interval 7; interval 8 not carinate near apex. Hind tibia with posterior surface strigulose . . . *Dercylus (sensu lato)* Laporte, 1832 . . . 2.

- 2 (1') Pronotum with anterior and posterior pair of marginal setae, or only anterior setigerous puncture present ..... 3.  
 2' Pronotum only with posterior pair of setae ..... 5.  
 3 (2') Only anterior setiferous puncture present ..... *Licinodercylus* Kuntz, 1912.  
 3' Pronotum with two pairs of setae ..... 4.  
 4 (3') Large specimens from Brazil, over 20 mm long ..... *Asporina* Laporte, 1834.  
 4' Specimen less than 20 mm long, distributed from Mexico to Brazil .....  
 ..... *Dercylodes* Chaudoir, 1882.  
 5 (2) Apterous specimens, with elytra fused along suture .....  
 ..... *Dercylus (sensu stricto)*.  
 5' Winged specimens, elytra not fused along suture. Anal segment of male with two setae ..... *Pterodercylus* Kuntz, 1912.

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 1. [GEB]

7. *Dercylus* Laporte, 1832. The species of this genus are arranged in five subgenera.

- 7.1. *Dercylus (sensu stricto)*. Eight species are included in this subgenus of which seven are known from Brazil.  
 7.2. *Pterodercylus* Kuntz, 1912. Two South American species are included.  
 7.3. *Dercylodes* Chaudoir, 1882. With nine species, distributed from Mexico to South America. Five species are known from Brazil. Specimens of *D. (Dercylodes) mexicanus* Bates, 1891, were collected on the Pacific coast of Mexico, in the states of Nayarit and Chiapas, in lowland tropical forest, in deep, damp, leaf litter. [GEB]  
 7.4. *Asporina* Laporte, 1834. With two Brazilian species.  
 7.5. *Licinodercylus* Kuntz, 1912. This is a monobasic subgenus, known from Brazil.

8. *Physomerus* Chaudoir, 1882. This genus contains two species from Colombia. The characters of this group are hardly enough to warrant its separation from *Dercylus*. Adults of *Physomerus* have slender, pterostichoid bodies. They resemble most closely specimens of *Asporina*, but the latter have a row of setae on each ventro-lateral margin of tarsomere 5. No doubt, the two genera are closely related, and further studies must be undertaken to determine if the two genera should be maintained, or if they should be combined. [GEB]

### Tribe Licinini<sup>1</sup>

This is a moderately diverse, highly divergent tribe, distributed in all of the major zoogeographical regions of the world, each region with one or more endemic genera. In the New World, the group is represented by two elements: a Holarctic temperate-tropical component, including *Diplocheila* Brullé, 1834, *Dicaelus* Bonelli, 1813, and *Badister* Clairville, 1806; and a southern hemisphere element represented by *Eutogeneius* Solier, 1849. Ball (1959) revised the Nearctic species.

#### KEY TO GENERA AND SUBGENERA OF NORTHERN MEXICAN AND NEOTROPICAL LICININI (ADULTS)

- 1 Dorsal surface of one mandible with broad, deep notch near middle ..... *Badister (sensu lato)* Clairville, 1806 . 2.  
 1' Dorsal surface of neither mandible notched near middle ..... 3.  
 2 (1) Right mandible with deep notch in dorsal surface, left mandible normal ..... *Badister (sensu stricto)*.  
 2' Left mandible with deep notch in dorsal surface, right mandible normal ..... *Baudia* Ragusa, 1884.  
 3 (1') Mandibles short, thick, left mandible with apical margin broad inverted plane, notched. Specimen from Chile ..... *Eutogeneius* Solier, 1849.

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 1. [GEB]

- 3' Mandibles trigonal, apices tapered, not broad, not notched. Specimen from Mexico or the Antilles ..... 4.
- 4 (3') Episternum of metathorax elongate, outer margin at least 1.25 times longer than anterior margin, latter wider than posterior margin. Tarsomere 5 ventrally without two rows of setae ..... *Diplocheila* Brullé, subgenus *Isorembus* Jeannel, 1949.
- 4' Episternum of metathorax markedly transverse, approximately rectangular, outer margin and anterior margin subequal in length. Tarsomere 5 with row of setae on each ventro-lateral margin ..... *Dicaelus (sensu lato)* Bonelli, 1813 ..... 5.
- 5 (4') Penultimate labial palpomere bisetose. Elytron with striae absent, or indicated only by rows of shallow punctures; intervals flat, except interval 7 carinate at base or not ..... *Liodicaelus* Casey, 1913.
- 5' Penultimate labial palpomere with at least four setae; striae deep, intervals convex, interval 7 sub-carinate throughout length of elytron ..... *Dicaelus (sensu stricto)*.

1. *Eutogeneius* Solier, 1849. This genus includes only *E. fuscus* Solier, 1849, known only from the type specimen which was collected in Chile, and is in the Museum National d'Histoire Naturelle, Paris. Ball (1959) did not classify this genus because he had not seen material. However, the type is a licinine, and the mandibles seem to be of the *Licinus* type (Ball, 1959: 7).

2. *Badister* Clairville, 1806. Representatives of this genus are in the Antillean subregion of the Neotropical Region, and on the mainland south at least to Belize (TLE): in the temperate and subtropical portions of the Holarctic Region; in the Oriental Region eastward to Java; in the Cape subregion of the Ethiopian Region, and on the island of Madagascar. Two subgenera are in the Neotropical Region.

Members of *Badister* inhabit *Typha* marshes, coastal forest swamps, *Sagittaria* swamps, and wet montane forests to elevations of about 1000 to 1300 meters.

2.1. *Badister (sensu stricto)*. Two species inhabit Mexico: *B. vandykei* Ball, 1959, is known from Baja California, and *B. flavipes mexicanus* Van Dyke, 1945, ranges from the southern edge of the Trans-Volcanic Sierra (Cuernavaca) south-eastward to Chiapas. Evidently, this subspecies at these latitudes is confined to higher elevations (about 1500 m). The Nearctic races of *B. flavipes* occur in localities near sea level.

2.2. *Baudia* Ragusa, 1884. Five species are known from the Neotropical Region. The ranges of two of these (*B. flexus* LeConte, 1880, and an undescribed species) include the islands of the Greater Antilles. Three other undescribed species are known from lowland Mexican localities.

3. *Diplocheila* Brullé, 1834. This wide-ranging Megagean genus is represented in the New World by the endemic *D. striatopunctata* group of subgenus *Isorembus* Jeannel. Of the eight Nearctic species, one, *D. major* LeConte, 1848, inhabits also the northern fringe of the Neotropical Region, but only the island of Cuba in the Greater Antilles.

4. *Dicaelus (sensu lato)* Bonelli, 1813. Adults of this genus are large beetles. All are brachypterous, and some (probably all) eat snails. Most of the species are inhabitants of mesic forests.

*Dicaelus* is endemic in the New World. Two of the three subgenera enter Mexico.

4.1. *Liodicaelus* Casey, 1913. Four species are in the highlands of northern and central Mexico, one of which, *D. laevipennis* LeConte, 1848, is represented in the Trans-Volcanic Sierra by an endemic subspecies, *D.l. flohri* Bates, 1878.

4.2. *Dicaelus (sensu stricto)*. One species, *D. costatus* LeConte, 1848, ranges southward to northern Tamaulipas, in the lowlands. [GEB]

#### Tribe Harpalini

One of the more highly diverse tribes of the family (as are Pterostichini and Lebiini), and

also much in need of a taxonomic revision. Although the tribe seems not well represented in the South American tropics, species of some genera are numerous. Some genera (especially stenolophines) are more diverse and divergent in the Palaearctic areas; and for these groups South America is zoogeographically marginal.

The supra-generic classification is not yet settled. A first attempt at a reclassification was that of van Emden (1953a), which was followed by later authors. Noonan (1973) revised the genera of Anisodactylina, and in 1976, he presented a synopsis of the genera of Harpalini of the world, grouping them in four subtribes. This scheme is used here, though I recognize that some of the subtribes may not be monophyletic.

Little is known about way of life and immature stages of Neotropical species. Van Emden (1942: 39-43) described larvae of *Anisotarsus* (at present considered a subgenus of *Notiobia*), *Trichopselaphus*, *Barysomus*, and *Acupalpus*. Nègre (1963: 210) refers to larvae of *Polpochila* (described by Chu, 1945).

#### KEY TO SUBTRIBES OF NEOTROPICAL HARPALINI (ADULTS)

- |          |   |                 |
|----------|---|-----------------|
| 1        | Penultimate labial palpomere plurisetose . . . . .  | 2.              |
| 1'       | Penultimate labial palpomere bi- or trisetose . . . . .   | 3.              |
| 2 ( 1 )  | Male with anterior and middle tarsomeres unmodified or dilated and with two longitudinal rows of adhesive setae ventrally . . . . .   | Harpalina.      |
| 2'       | Male with anterior and middle tarsomeres dilated, with numerous longitudinal rows of adhesive setae (ventral surfaces of tarsomeres appearing to be covered with spongy pubescence) . . . . . | Anisodactylina. |
| 3 ( 1' ) | Male with anterior tarsus unmodified, or dilated and basal tarsomeres each with two longitudinal rows of adhesive setae . . . . .   | Stenolophina.   |
| 3'       | Anterior tarsomeres of male dilated, with spongy pubescence ventrally . . . . .   | Pelmatellina.   |

#### Subtribe Pelmatellina<sup>1</sup>

A subtribe of small harpalines, represented in the Neotropical Region by only two genera and a few species.

#### KEY TO GENERA AND SUBGENERA OF NEOTROPICAL PELMATELLINA (ADULTS)

- |          |  |  |
|----------|--|--|
| 1        | Prothorax elongate, sides of pronotum with long sinuation before acute posterior angles. Metepisternum about as long as wide. Hind wings reduced. Body depigmented. Specimen from Juan Fernandez Islands . . . . .   | <i>Trachysarus</i> Reed, 1874.                       |
| 1'       | Prothorax average, sides of pronotum either rounded with rounded posterior angles, or with short sinuations and posterior angles rectangular. Metepisternum longer than wide, or as long as wide. Hind wings reduced or fully developed. Color of body piceous or metallic . . . . . | <i>Pelmatellus (sensu lato)</i> Bates, 1882 . . . 2. |
| 2 ( 1' ) | Elytral stria 2 without discal puncture. Male with vestiture on ventral surfaces of front tarsomeres, only . . . . .   | <i>P. (Thenarellus)</i> Bates, 1882.                 |
| 2'       | Elytral stria 2 with single discal puncture. Male with vestiture on ventral surfaces of front and middle tarsomeres . . . . .  | <i>Pelmatellus (sensu stricto)</i> .                 |

1. *Pelmatellus (sensu lato)* Bates, 1882. A genus with 11 species from higher altitudes in Mexico, Guatemala, and Costa Rica, two of which are also in the mountains of southwestern United States. Goulet (1974) revised the Middle American species of the genus, including in *Pelmatellus* the taxon *Thenarelhus* Bates, as a subgenus. According to Goulet (1974: 98), it is doubtful that the four Ecuadorian, one Brazilian, and one Argentinian species belong in the same genus. Nonetheless, these South American taxa are clearly related to the Middle American species that Goulet studied.

1.1. *Pelmatellus (sensu stricto)*. Included are nine Mexican-Guatemalan species (two of which enter United States), and, as *incertae sedis*, six South American species.

1.2. *Thenarelhus* Bates. Two species are included: one from Mexico, and one from Costa Rica.

2. *Trachysarus* Reed, 1874. Straneo (1955, in Straneo and Jeannel, 1955: 137-138) placed this genus in Pelmatellina, and this was accepted by Goulet (1974: 83) and Noonan (1976: 8). Van Emden (1953a: 516) placed the genus in Acupalpina (a group which is included in the Stenolophina by Noonan (1976)), but the vestiture of the male tarsi do not permit such an allocation. The group is endemic to the Juan Fernandez Islands of Chile, and includes nine species. *Trachysarus antarcticus* Reed, 1874, from the Chilean mainland, does not belong to this genus (van Emden, 1953a).

#### Subtribe Anisodactylina

This is the only subtribe of Harpalini recently revised at the generic level (Noonan, 1973). The group occurs in all regions, predominantly in temperate zones, with a total of 24 genera. The six Neotropical genera are also predominantly temperate in distribution, being especially diverse in Chile and Argentina.

#### KEY TO GENERA AND SUBGENERA OF NEOTROPICAL ANISODACTYLINA (ADULTS)

- |          |   |  |
|----------|---|--|
| 1        | Pronotum with two lateral setae on each side (anterior seta before or in mid-region of lateral margin, and posterior seta in region of posterior angle). Dorsum dark metallic green, elytral apices dark metallic green or cupreous . . . . . | <i>Allendia</i> Noonan, 1974.                      |
| 1'       | Pronotum with one lateral seta on each side (near mid-region of lateral margin) . . . . .   | 2.   |
| 2 ( 1' ) | Mentum and submentum fused, not separated by suture. Interval 3 of elytron with three to six setigerous punctures in row from apex to or nearly to base. Mentum with tooth . . . . .  | <i>Anisostichus</i> van Emden, 1953.               |
| 2'       | Mentum and submentum separated by complete transverse suture . . . . .  | 3.   |
| 3 ( 2' ) | Size small, length of body less than 8.0 mm. Metathorax reduced, metepisternum very short. Hind wings reduced. Body depigmented. Specimen from Chile . . . . .  | <i>Nemaglossa</i> Solier, 1849.                    |
| 3'       | Size larger, length of body at least 8.0 mm. Metathorax and hind wings fully developed or reduced. Body variously colored, many specimens with at least dorsum metallic coppery, green, blue, or purple . . . . .                             | 4.   |
| 4 ( 3' ) | Disc of pronotum glabrous, except single lateral seta each side. Abdominal sterna with or without extra setae . . . . .   | <i>Notiobia (sensu lato)</i> Perty, 1830 . . . . . |
| 4'       | Disc of pronotum pubescent at least along lateral part of apical margin. Abdominal sterna with extra setae . . . . .  | 8.   |

- 5 ( 4 ) Gena wide, at narrowest point wider than maximum width of antennal scape. Frontal fovea of head without clypeo-ocular prolongation. Eyes of most specimens not large and protruding ..... *N. (Anisotarsus) Chaudoir, 1837* (part).
- 5' Gena narrow, at narrowest point narrower than maximum width of antennal scape; or frontal fovea of head with clypeo-ocular prolongation .. 6.
- 6 ( 5' ) Frontal fovea of head with clypeo-ocular prolongation ..... *N. (Notiobia) sensu stricto* (part).
- 6' Frontal fovea of head without clypeo-frontal prolongation ..... 7.
- 7 ( 6' ) Frontal fovea of head large, prominent. Supra-antennal ridges markedly divergent anteriorly from eyes. Eyes large and protruding ..... *N. (Notiobia) sensu stricto* (part).
- 7' Frontal fovea of head small, not prominent. Supra-antennal ridges various, in most specimens not markedly divergent anteriorly from eyes. Size of eyes various ..... *Notiobia (Anisotarsus) Chaudoir, 1837* (part).
- 8 ( 4' ) Ligula with apex narrow, not laterally expanded and dorsum with four or five distal setae. Pronotum not strongly cordate, lateral depression not sharply delimited. Pronotal pubescence extended along lateral portions of basal and apical margins and along side. Elytral intervals 1, 3, 5 and 7 each with row of dorsal setigerous punctures ..... *Pseudanisotarsus* Noonan, 1973.
- 8' Ligula with apex markedly expanded laterally and dorsum without setae. Pronotum markedly cordate and with lateral depression broadly concave and sharply delimited from disc. Pubescence on pronotum restricted to lateral part of apex. Odd and in some specimens also even elytral intervals each with irregular row of non-setigerous punctures ..... *Criniventer* van Emden, 1953.

3. *Nemaglossa* Solier, 1849 (*Nematoglossa* Gemminger and Harold, 1868). A monobasic genus from Chile. This group has generally been included in the Pelmatellina, but the plurisetose labial palpomeres and setose intercoxal process of the prosternum indicate that *Nemaglossa* is an anisodactyline. More specifically, it belongs in the notiobioid complex. [GEB]

4. *Pseudanisotarsus* Noonan, 1973. Monobasic genus for *A. nicki* (van Emden), described from Argentina, and possibly also occurs in Brazil (Sao Paulo).

5. *Allendia* Noonan, 1974. Also a monobasic genus erected by Noonan (1974: 220) for *Harpalus chilensis* Solier, 1849, and cited by Csiki (1932a: 1049) as *Anisotarsus*, and stated by van Emden (1953a: 520) to belong to the Pelmatellina. The species occurs in Chile and Andean Argentina (Chubut and Rio Negro).

6. *Criniventer* van Emden, 1953. A monobasic genus for *A. rufus* (Brullé, 1838), from Uruguay, Argentina and Chile.

7. *Notiobia (sensu lato)* Perty, 1830. A markedly diverse genus, which includes *Anisotarsus* as subgenus. Besides the two subgenera present in the neotropics, there is a third subgenus restricted to tropical Africa.

7.1. *Notiobia (sensu stricto)* (=*Rhagodactylus* Chaudoir, 1835; =*Batrachion* Chevrolat, 1842). A moderately diverse subgenus, with 32 species distributed from Mexico to Argentina; five have been recorded from Brazil.

7.2. *Anisotarsus* Chaudoir, 1837 (=*Eurytrichus* LeConte, 1848; *Stiboloidus* Casey, 1914). Previously to Noonan's revision (1973), this group was considered a distinct genus, with *Anisostichus* van Emden, 1953, *Eurytrichus* and *Stiboloidus* as subgenera. As now considered, it includes 19 species, four from Brazil. Revision of species in van Emden (1953a: 520-527).

8. *Anisostichus* van Emden, 1953. Described as a subgenus of *Anisotarsus* Chaudoir, 1837, was raised to genus by Noonan (1973) and includes four Argentinian species (revision in van Emden, (1953)).

9. *Anisodactylus* Dejean, 1829 (= *Anadaptus* Casey, 1914). A markedly diverse Nearctic genus, one species of which, *A. rotundangulus* Bates, is in Mexico, in the Trans-Volcanic Sierra.

Subtribe Stenolophina (= Cratocarina + Bradycellina of authors)

A subtribe of more temperate distribution, and represented in the tropics by few genera. Noonan (1976) gave the tribe a new definition, including in it elements of different groups.

KEY TO GENERA AND SUBGENERA OF  
NEOTROPICAL STENOLOPHINA (ADULTS)<sup>1</sup>

- |        |  |   |    |
|--------|--|---|----|
| 1      | Mentum with tooth .....  | 2.  |    |
| 1'     | Mentum edentate .....  | 8.  |    |
| 2 (1)  | Basitarsus and tarsomere 2 of front tarsus asymmetric, inner apical angle extended as spine-like process. Size large, length of body 10.0 mm or more .....   | <i>Polpochila (sensu lato)</i> Solier, 1849 .....     | 3. |
| 2'     | Basitarsus and tarsomere 2 symmetric, inner apical angle not extended ..   | 4.  |    |
| 3 (2)  | Sub-pygidal sternum with same number of setae in both sexes. Head enlarged, with wide genae, especially males. Eyes reduced. Specimen from highlands of northern Mexico, or desert areas of southwestern United States ..... | <i>P. (Phymatocephalus)</i> Schaum, 1864.             |    |
| 3'     | Sub-pygidal sternum with one seta each side in male, two each side in female. Head normally developed. Eyes normal .....   | <i>Polpochila (sensu stricto)</i> .                   |    |
| 4 (2') | Head with frontal impressions deep, long, extended posterad of hind margins of eyes; elytron without sutural stria; pronotum with posterior margin with complete transverse groove .....                                     | <i>Pogonodaptus</i> Horn, 1881.                       |    |
| 4'     | Head with frontal impressions shallower, shorter; if extended laterad, groove terminated near front margin of eyes .....   | 5.  |    |
| 5 (4') | Size large, length of body 10.00 mm or more. Elytron with stria 8 arched posterad of umbilical puncture 6, latter as close to 5 as 5 is to 4; scutellar stria present. Specimen from Chile .....                             | <i>Paramecus</i> Dejean, 1829.                        |    |
| 5'     | Size small, length of body less than 6.0 mm. Elytron with umbilical puncture 6 removed from 5 farther than distance between 5 and 4; scutellar stria absent .....  | 6.  |    |
| 6 (5') | Elytron with only stria 1 sharply impressed, others absent or evanescent .....   | <i>Bradycellus (Liocellus)</i> Motschulsky, 1864.     |    |
| 6'     | Elytron with all striae equally and normally impressed .....   | 7.  |    |
| 7 (6') | Pronotum with posterior angles rounded .....   | <i>Bradycellus (Stenocellus)</i> Casey, 1914.         |    |
| 7'     | Pronotum with posterior angles angulate, sides sinuate posteriorly .....   | <i>Goniocellus</i> Casey, 1914.                       |    |
| 8 (1') | Elytron with posterior series of umbilicate punctures not divided into two groups of four punctures each .....   | <i>Acupalpus</i> Latreille, 1829.                     |    |
| 8'     | Elytron with posterior series of umbilicate punctures divided into two groups of four punctures each .....   | <i>Stenolophus (sensu stricto)</i> Dejean, 1829 ..... |    |
| 9 (8') | Tarsomeres 1-4 of hind tarsus each with pair of setae dorsally, and tarsomere 5 with one pair ventrally. Size small, body length less than 5.5 mm. Pronotum rounded. Elytra not iridescent .....                             | <i>S. (conjunctus Group)</i> .                        |    |
| 9'     | Tarsomeres of hind tarsus glabrous; pronotum with hind angles broadly rounded .....  | 10.   |    |

- 10 ( 9') Tarsi slender, hind tarsus with basitarsus longer than tarsomere 2. Anterior tibia with two or three spines at outer margin, near apex .....  
..... *Stenolophus (sensu stricto)*.  
10' Tarsi thicker, basitarsus of hind tarsus hardly longer than 2. Anterior tibia with four to six spines at outer margin near apex .....  
..... *S. (Agonoderus)* Dejean, 1829.

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1. [GEB]

10. *Bradyceillus (sensu lato)* Erichson, 1837 (=*Acupalpus* Thomson not Latreille, 1829). Of the eight subgenera cited by Ball (1960: 86), only two have Neotropical representatives. However, the species are not well understood, and many remain to be described. Further work might reveal previously unrecognized species groups.

10.1. *Stenocellus* Casey, 1914. This group includes about 50 species, 14 of which are known from the Neotropical Region. Five of these are recorded from the Antilles.

10.2. *Liocellus* Motschulsky, 1864. Like *Stenocellus*, maximally diverse in the Nearctic Region, but with two species in the Mexican highlands.

11. *Goniocellus* Casey, 1914. A genus described for two Panamanian species. This group should probably be ranked as a subgenus of *Bradyceillus*. [GEB]

12. *Acupalpus* Latreille, 1829. A markedly diverse, worldwide genus, whose species are arranged in several subgenera. The Neotropical species (including those of Middle America) have not been properly studied, and their subgeneric position is uncertain.

13. *Stenolophus* Dejean, 1829. Also a markedly diverse, worldwide genus. Csiki (1932a: 1259) considered it to be a subgenus of *Acupalpus*; more recent authors give it generic rank. Thirteen described Neotropical species are included, distributed from Middle to South America. Three New World groups are recognized: *Agonoderus* Dejean, 1829, with seven Nearctic species, two of which (*S. binotatus* Casey, 1914, and *S. comma* Fabricius, 1801) are known from the Mexican Plateau; the *conjunctus* Group, represented on the Mexican Plateau, and further north; and *Stenolophus (sensu stricto)*, which contains both temperate and tropical species.

14. *Polpochila* Solier, 1849. A moderately diverse, Neotropical genus of very homogeneous structure. Négre (1963) in a revision, considered two subgenera, but did not present a key to distinguish them and even the keys to species are difficult to use. In his later paper (1976b), the two subgenera are distinguished in a key.

14.1. *Polpochila (sensu stricto)* (=*Cratognathus* Perty, 1830, nec Dejean, 1831; =*Melanotus* Dejean, 1831, nec Erichson, 1829; =*Cratocara* LeConte, 1863). A subgenus with disjunct distribution: two Mexican and 16 South American species (of which nine are Brazilian and one Chilean). Noonan (1976) has shown that because of problems related to the designation of type-species, *Cratocara* is a junior synonym of *Polpochila (sensu stricto)*, and cannot be used as the name for the second subgenus.

14.2. *Phymatocephalus* Schaum, 1864. This subgenus includes only three Sonoran species, which range from Arizona to Central Mexico, in high, dry areas.

15. *Pogonodaptus* Horn, 1881. A genus which comprises three species, one ranging from Central America to Texas, one from Panama, and one from Haiti. Two of these species live in marshes and swamps.

16. *Paramecus* Dejean, 1829 (=*Cylloscelis* Curtis, 1839). A Chilean genus with three species.

#### Subtribe Harpalina

The most diverse of the subtribes, this is also the most diverse of the Neotropical groups. According to van Emden (1958), only the Selenophori, whose males have the ostium of the

aedeagus located dorsally, are represented in South America. Noonan (1976) places the Neotropical genera in two groups, the Selenophori and the Amblystomi. Several of the genera which occur in Mexico are actually Nearctic elements in the fauna.

KEY TO GENERA OF NEOTROPICAL  
AND NORTHERN MEXICAN HARPALINA (ADULTS)<sup>1</sup>

- 1 Elytron with striae 2, 5 and 7 impunctate ..... 2.  
 1' Elytron with at least stria 2 with several small setigerous punctures ..... 4.  
 2 ( 1 ) Anterior tibia with outer apical portion prolonged as broad spine; apical spur much broader than perapical spur; elytron with large setigerous punctures in at least odd-numbered intervals, each puncture with long seta ..... *Euryderus* LeConte, 1848.  
 2' Anterior tibia with outer apical portion normal, not prolonged; apical spur various; elytral intervals without setigerous punctures, or these few and confined to apical 0.33 ..... 3.  
 3 ( 2' ) Paraglossae setulose ..... *Harpalus* Latreille, 1802.  
 3' Paraglossae glabrous ..... *Aztecarpalus* Ball, 1970.  
 4 ( 1' ) Elytron with stria 7 impunctate on discal portion, stria 5 with or without setigerous punctures ..... 5.  
 4' Elytron with setigerous punctures in striae 2, 5 and 7 ..... 8.  
 5 ( 4 ) Clypeus with anterior margin deeply concave, basal membrane of labrum visible; body very broad, prothorax short ..... *Barysomus* Dejean, 1829.  
 5' Clypeus with anterior margin straight or slightly concave, basal membrane of labrum not evident ..... 6.  
 6 ( 5' ) Prothorax elongate in front of coxae, distance from anterior margin of pronotum to anterior rim of front coxal cavity twice distance from latter point to apex of intercoxal process; female with basitarsus of front tarsus enlarged, at least 2.0 times wider than following tarsomeres ..... *Stenomorphus* Dejean, 1831.  
 6' Prothorax of normal proportions, not prolonged anteriorly ..... 7.  
 7 ( 5' ) Front tibia with outer apical angle prolonged as broad lobe with several spines; outer margin crenate; dorsal surfaces of tarsomeres glabrous; basitarsus of hind tarsus not much longer than tarsomere 2; ventral surface of body without sparse covering of short setae; body markedly convex, cylindrical in cross section ..... *Anisocnemus* Chaudoir, 1843.  
 7' Front tibia with outer apical angle not prolonged, or in male prolonged as small, sharp spine, flanked by spines; dorsal surface of tarsomeres setulose; basitarsus of hind tarsus longer than tarsomere 2, almost as long as 2 + 3 ..... *Trichopselaphus* Chaudoir, 1843.  
 8 ( 4' ) Head enlarged, clypeus with anterior margin distinctly concave, basal membrane of labrum narrowly exposed; elytra iridescent ..... *Amblygnathus* Dejean, 1829.  
 8' Head average, anterior margin of clypeus straight or only very slightly concave; luster of elytra various, iridescent or not ..... 9.  
 9 ( 8' ) Elytral intervals more or less densely setigerously punctate, or rugulose ..... *Athrostictus* Bates, 1878.  
 9' Elytral intervals impunctate, smooth ..... 10.  
 10 ( 9' ) Body subcylindrical; male with middle tibia bowed .....

1. [GEB]

- 10 ( 9') ..... *Discoderus* LeConte, 1853.  
 10' Body not subcylindrical, average in form; male with middle tibia  
 straight ..... *Selenophorus* Dejean, 1829, *Gynandropus* Dejean, 1831.

### The Harpalii Group<sup>1</sup>

Primarily a Megagean group, two genera are represented in Mexico, but not in the Neotropical Region. Of these, *Euryderus* LeConte, 1848, (a monobasic genus, containing *E. grossus* Say, 1834), is known in Mexico only from northern Sonora. *Harpalus* Latreille, 1802 is in the deserts and mountains of northern Mexico, in the Trans-Volcanic Sierra, and in the mountains of Oaxaca. About 15 species are in Mexico, several of which are undescribed. The group in Mexico is maximally diverse and divergent in the Sierra Madre Occidental.

### The Selenophori Group<sup>1</sup>

17. *Aztecarpalus* Ball, 1970. A genus with 11 species (Ball, 1970 and 1976), ranging from Oaxaca northeastward to southernmost Texas. Members of the genus inhabit montane forests, with *A. schaefferi* occurring also in subtropical semi-arid lowland forest in northeastern Mexico.

18. *Selenophorus* Dejean, 1829 (=*Hemisopalpus* Casey, 1914; =*Celiamorphus* Casey, 1914; =*Selenalius* Casey, 1914). A markedly diverse Nearctic and Neotropical genus, badly in need of revision. The Nearctic species were arrayed in subgenera by Casey (1914). In the Neotropics there are 142 described species, of which 45 are known from Brazil. The species inhabit a wide variety of habitats, including forests from sea level to about 2500 meters, as well as open habitats, such as grassland and deserts. A few species are synanthropic occurring in tropical gardens, yards and under sidewalks.

19. *Gynandropus* Dejean, 1831. A Neotropical genus (with one species in North America, *G. hylacis* Say, 1823), with 12 species in Middle and South America, three of which are known from Brazil.

It is doubtful that this group is generically different from *Selenophorus*: at least there are no characters that distinguish between adults of the two groups. The key character of the expanded basitarsus of the front tarsus of females is not constant, for females of some species that are *Gynandropus* - like in habitus do not exhibit the modified front tarsus. Members of this group inhabit mesic lowland forests. The group needs to be revised.

20. *Discoderus* LeConte, 1853. This is a moderately extensive genus, with nine described species in Mexico. The group is basically dry-adapted, ranging from upland oak forests in Chiapas to the North American deserts and grasslands, with one species reaching southern Canada. The species are not all understood. Probably *Discoderus* should be included in *Selenophorus*, as a subgenus.

21. *Athrostictus* Bates, 1878 (=*Arthrostictus* auct.). This is a moderately divergent group, with some 16 species, three of which are known from Brazil. Of the three Mexican species, specimens of one (*A. punculatus* Putzeys, 1878) have been collected in Brownsville, Texas. The species inhabit lowlands: in Mexico, specimens are found in drier, open forests. Some are "domestic" [TLE].

22. *Amblygnathus* Dejean, 1829. A genus comprising about 20 species (nine described) from the West Indies (one species), Middle America, and northern South America. Mexican members inhabit the environs of *Sagittaria* and *Typha* marshes. The group is close to *Selenophorus*, and perhaps should be treated as a subgenus of that genus.

1. [GEB]

23. *Trichopselaphus* Chaudoir, 1843. A Neotropical genus, ranging from the tropical parts of South America to Mexico, where members inhabit the lowland and lower montane tropical forests. Only two species have been described, but six are known: two from South America only; three from Middle America; and one from both of these areas (*T. subiridescens* Chaudoir, 1843, the type species.)

24. *Anisocnemus* Chaudoir, 1843. This genus includes the single described species *A. validus* Chaudoir, 1843, whose range extends from Venezuela and Colombia to central Mexico. Adults inhabit wet, open areas, from lowlands to elevations of about 1000 meters.

25. *Stenomorphus* Dejean, 1831 (*Agaosoma* Menetries, 1844). Revised by Darlington (1936), it comprises 10 species, most of which are in mainland Middle and northern South America. One species (*S. californicus* Ménétries, 1844) is in southern United States, and one (*S. manni* Darlington, 1934) is in the West Indies.

#### The Amblystomi Group

26. *Barysomus* Dejean, 1829. A genus with six species from Central America, of which one is known from Brazil.

#### Tribe Peleciini (=Disphaericini)

A tribe of few species occurring in Africa and India (genera *Disphaericus* Waterhouse, 1842 and *Dyschiridium* Chaudoir, 1861 (=*Spanus* Westwood, 1864)), and in the Neotropical Region (genus *Pelecium* Kirby, 1817 (=*Eripus* Dejean, 1819; =*Augasmosomus* Chaudoir, 1846)). *Disphaericus* and *Dyschiridium* were originally considered as related to *Pelecium*, but Sloane (1923a: 248) erected the tribe *Disphaericini* for *Disphaericus* especially because adults of this African genus have two pairs of supraorbital setae (a single pair of *Pelecium*), the three basal antennal articles pubescent (glabrous in *Pelecium*). Sloane was followed by Csiki, who placed the genera in distinct tribes and far removed from each other in this system (*Disphaericini*, Csiki, 1929: 400-401; *Peleciini*, Csiki, 1932b: 1285-1287).

Jeannel (1942b; 1948: 376) and Basilewsky (1953: 113) united the African-Oriental genera to *Pelecium* in a single tribe, an opinion with which I concur. The Australian Agonicini are probably also closely related to the *Peleciini*.

In the Neotropical Region occur 32 South American species (of which 25 are known from Brazil) and seven from Mexico. Thus far there are no records from Central America or from the West Indies. In general the species are rare in collections, and little is known about their way of life. Adults are specialized predators of Myriapods [TLE]. *Pelecium sulcatum* Guerin, 1843, from Colombia, was studied by Salt (1928) who found larvae and pupae of the species. Larvae are ectoparasites of Myriapoda. Unfortunately the larvae were not described (see also comments by Erwin, 1967).

In the past, *Peleciini* were thought to be related to *Panagaeini*, another quite heterogeneous tribe (p. 403). No doubt that *Pelecium* shows some similarities with *Brachygnathus*, the only genus of *Panagaeini* whose adults exhibit dorsally glabrous and metallic surfaces. In shape of head, the two tribes are quite similar. The differences, however, in detail, are great, especially as to number of cephalic and pronotal setae, as well as to antennal pubescence. But considering the heterogeneity of these characters in the three genera included in *Peleciini*, as seen above, it is possible that the two tribes are more closely related than thought.

#### Tribe Masoreini (=Anaulacini, Cyclosomini, Tetragonoderini)

A very heterogeneous tribe formed by the fusion of the *Anaulacini* and *Tetragonoderini* (Jeannel, 1949a: 860; Ball, 1960: 156). Jeannel (1949a) also included *Nemotarsus* LeConte,

1853, a genus here preferred as placed within the Lebiini (p. 444), following Ball (1960: 157-158) and Lindroth (1969a: 1014).

The taxa and their arrangement are poorly understood. The arrangement here is provisional, being based on preliminary study of masoreine genera. Jeannel (1949) distinguished two groups (excluding the Nemotarsina), which are, provisionally, considered as subtribes. Van Emden (1942: 20, 47) maintained the two groups as distinct tribes; only Old World larvae are known.

#### KEY TO SUBTRIBES OF NEOTROPICAL MASOREINI (ADULTS)<sup>1</sup>

- 1 Each mandible markedly curved, dorso-lateral margin toward base projected laterally farther than ventro-lateral margin; spurs of middle and hind tibiae with margins smooth . . . . . *Masoreina*.
- 1' Curvature of mandibles average, dorso-lateral margin toward base not projected farther laterad than ventro-lateral margin. Spurs of middle and hind tibiae with margins serrulate . . . . . *Tetragonoderina*.

#### Subtribe *Masoreina*<sup>1</sup>

This group seems to be basically Inabrazilian, but is well represented in the southern reaches of the Palaearctic Region, and as far south and east as New Guinea. Schaufuss (1879: 552) described *Masoreus ridiculous* from the Lesser Antillean island of Saint Thomas, but Erwin (1977: 90) transferred this species to the tachyneine genus *Polyderis*. Thus, there are two genera of *Masoreina* in the New World, as follows:

#### KEY TO NEOTROPICAL GENERA OF MASOREINA (ADULTS)

- 1 Antenna filiform, articles 5-10 longer than wide. Microsculpture of elytron with meshes isodiametric or slightly longitudinal, but not arranged in rows; surface dull, not iridescent . . . . . *Aephnidius* MacLeay, 1825.
- 1' Antenna submoniliform, articles 5-10 short, subquadrate to slightly transverse. Microsculpture of elytron with meshes longitudinal, in rows. Surface iridescent . . . . . *Macracanthus* Chaudoir, 1846.

1. *Aephnidius* MacLeay, 1825. The range of this genus is Inabrazilian, with one species in the Old World extending northward on the coast to the Japanese Archipelago. In the Neotropical Region, four species are included: one is known from Mexico, three from Brazil. [GEB]

2. *Macracanthus* (*sensu lato*) Chaudoir, 1846 (=*Masoreus* (in part, *auct.*)). The species seem to be closely related to those of the Old World included in *Anaulacus* MacLeay. Probably these groups are congeneric. Certainly, *Macracanthus* and *Masoreus* are not closely related. There are six species in the Neotropical Region, arrayed in two subgenera.

#### KEY TO SUBGENERA OF *MACRACANTHUS* CHAUDOIR (ADULTS)

- 1 Humerus of elytron rectangular; elytron with one or two rows of tubercles . . . . . *Ophryognathus* Chaudoir, 1876.
- 1' Humerus rounded; elytron without tubercles . . . . . *Macracanthus* *sensu stricto*.

1. [GEB]

2.1. *Macracanthus* (*sensu stricto*). This group includes five species: two from the Antilles; one from Middle America; and two from Brazil.

2.2. *Ophryognathus* Chaudoir, 1876. (= *Leptotomus* Gahan, 1894). Included in this subgenus is the single species *M. (O.) tuberculatus* Chaudoir. Van Emden (1949) considered this species to include two subspecies: one from Venezuela, the other from Brazil (Bahia and São Paulo) and Paraguay. Adults of the latter have been recorded from nests of leaf-cutter ants (*Atta sexdens*). [GEB]

### Subtribe Tetragonoderina

A subtribe with broad distribution, represented in the Neotropics only by *Tetragonoderus*.

3. *Tetragonoderus* (*sensu latissime*) Dejean, 1829. A genus of wide distribution in Africa and Asia, and with a large number of Neotropical species. The species are riparian, usually collected in large numbers in the same locality. The species are not understood, and there are no recent revisions. Chaudoir (1876a) published a revision of the Masoreini, including *Tetragonoderus*; identification of species, however, is very difficult. More recently Allen (1973) studied some of the species from Bolivia. (Two subgenera are generally recognized, but they are likely not valid. More likely, all of the New World tetragonoderines should be included in a distinct genus, *Peronoscelis*. [GEB]).

3.1. *Tetragonoderus* (*sensu lato*), includes 25 species distributed from Mexico to South America. Five have been recorded from Brazil. *Tetragonoderus viridis* (Dejean, 1831), an apparently common species in Chile and Argentina, characterized by green, bluish or coppery-metallic colors, was placed by Chaudoir in a distinct genus, *Crossonychus* (Chaudoir, 1848, 1: 98), but in the already mentioned revision of the tribe, Chaudoir writes "... j'avais séparé cet insecte des *Dromius* et proposé le nom générique de *Crossonychus*, mais maintenant l'étude de genre *Tetragonoderus* m'a convaincu qu'il en faisait partie, ainsi que les espèces précédentes". Notwithstanding this statement, catalogs (Csiki, 1932b, 124: 1301; Blackwelder, 1944: 52) cite the genus as valid. I prefer to consider it consubgeneric with *Tetragonoderus*.

3.2. *Peronoscelis* Chaudoir, 1876. This subgenus includes 13 species with distribution in the New World similar to that of *Tetragonoderus*. Ten species are known from Brazil. Allen (1973) studied the Bolivian species of the subgenus.

### Tribe Pentagonalicini

This tribe is of cosmopolitan distribution, but with predominance in Asia, southeast Asian islands and Australia-New Zealand. Two genera are endemic to Australia and New Zealand: *Scopodes* Erichson, 1842 and *Actenonyx* White, 1846; all remaining species, including the Neotropical ones, are included in *Pentagonica* Schmidt-Goebel, 1846 (= *Rhombodera* Reiche, 1842, *nec* Burmeister, 1838; = *Didetus* LeConte, 1853).

Liebke (1939: 129) described a monobasic genus, *Thoasia*, which he placed in Pentagonalicini in spite of bilobed tarsomere 4 and pectinate claws (bilobed and smooth claws characterize pentagonalicine adults). Reichardt (1968a: 147) maintained the genus in that tribe, but it seems now that its correct position is in Lebiini, next to *Onota* Chaudoir, 1872 (p. 441). It is even possible that it is congeneric with Chaudoir's genus.

Reichardt (1968a) published a preliminary revision of the New World species, of which 27 are recorded from the Neotropical Region, 10 from Brazil.

Larvae and habits of *Pentagonica* members are unknown. Moore (1965: 161-162, fig. 8-9) described the first larva of the tribe, of *Scopodes simplex*. According to this author, the larval characters indicate relationship between Pentagonalicini and Odacanthini.

### Tribe Agrini<sup>1</sup>

Current studies indicate that this tribe has a series of apotypic character states of the defense mechanism shared with the Lebiini, Eucheilini, Perigonini, "Masoreitae", Odacanthini, Pentagonalicini, Catapiessini, Amorphomerini, and other lebiomorph carabids given tribal status by most authors (Erwin, MS; Erwin and Erwin, 1976). These same studies indicate *Agra* may be the sister group of the lebiine *Calleida*, therefore its status as a tribe is doubtful and only

<sup>1</sup> [TLE]

maintained here until definitive studies are published.

This large group of exclusively Neotropical and southern Nearctic beetles ranges from southern Texas (two species) to northern Argentina. Csiki (1932: 1509) miscited *Arsinoe biguttata* Chaudoir (1877: 233) as *Agra* and therefore this genus is not known from Gabon. There are 372 species described and several decades more undescribed. Adults are elongate and narrow beetles with prolonged heads and long legs, most are of somber coloration but a few species groups are brightly metallic. Larvae are unknown. Adults live in the canopy of tropical forests running over the surface of leaves when active and hiding in rolled, wilted leaves when resting. Usually only single specimens are found at these sites in the undercanopy. Their mouth parts and prolonged head and pronotum indicate they have peculiar feeding habits. They have a powerful defensive propellant which is sprayed from apical abdominal nozzles (Erwin and Erwin, 1976). Most museum specimens were collected at light at night.

Liebke (1940a; 1940b) revised some species and described new ones. Straneo also published several papers on the genus (1955a; 1958a; 1965; 1966). Neither worker however, made a synopsis or key to species and is virtually impossible to identify specimens without recourse to type material.

1. *Agra* Fabricius, 1801 (=*Agridia* Chaudoir, 1861). This huge genus regarded by Liebke (1951) as comprising two subgenera and by Straneo as two genera is a diverse lot of species all generally with the same body form. However, the number of divergent character states and multiple sexual differences make this group among the most bizarre in the entire family. The character used to separate the supposed two named groups is the degree of flatness of the tibiae. Since flat tibiae characterize adults of several species groups throughout the genus it cannot be used as a uniting character state. It is probably an adaptation to certain arboreal habits or perhaps to life with ants (e.g. all adult Helluonini, Paussini and Pseudomorphini and some Ozaenini have flat tibiae and are ant symbionts).

#### Tribe Odacanthini (=Colliurini)

A tribe of small, predaceous carabids, usually found inhabiting forests, world-wide in distribution. Liebke (1930) revised the American species of the tribe and later (1938) he revised the world fauna, however, including in it the Ctenodactylini (an action already done by Csiki, 1932: 124b: 1517-1547). I prefer to follow more recent authors, who consider the Odacanthini as distinct from Ctenodactylini. Van Emden (1942: 51), who described Old World larvae, unites the two tribes in one.

Excluding Ctenodactylini, the tribe is of limited diversity, with a large, cosmopolitan genus, *Colliuris* Degeer, 1774, besides about 15 smaller genera. Only three are known from the Neotropical Region, and the species of *Colliuris* are arranged in many subgenera.

#### KEY TO GENERA AND SUBGENERA OF NEOTROPICAL ODACANTHINI (ADULTS)

- |          |   |    |
|----------|---|----|
| 1        | Tarsomere 4 simple or only slightly emarginate . . . . .  | 3. |
|          | ..... <i>Colliuris (sensu lato)</i> Degeer, 1774 . . . . .  |    |
| 1'       | Tarsomere 4 deeply bilobed . . . . .  | 2. |
| 2 ( 1' ) | Transition between head and neck with simple sulcus, not deeply emarginate at sides. Maxilla without tooth. Pronotum same in both sexes . . . . . |    |
|          | ..... <i>Calophaena</i> Klug, 1821.   |    |
| 2'       | Transition between head and neck very compressed laterally, with deep, narrow cut, and not sulcate dorsally and ventrally. Right maxilla with     |    |

- strong tooth. Pronotum almost square, with front angles of male lobate toward front, less strongly so in female; in both sexes sides markedly expanded ..... *Calophaenoidea* Liebke, 1930.
- 3 (1) Posterior part of head with numerous setae ..... 4.
- 3' Posterior part of head glabrous ..... 8.
- 4 (3) Head with one or more setae posteriorly, shorter, with prominent eyes. Pronotum bottle-shaped, very convex. Elytra short, convex, with striae of coarse punctures ..... *Odacanthomimus* Liebke, 1938.
- 4' Head and pronotum with numerous setae ..... 5.
- 5 (4') External apical and sutural angle of elytron with long spine. All elytral intervals with setae ..... *Colliuris (sensu stricto)*.
- 5' Sutural angle without long spine or with short spine; external angle spined or not ..... 6.
- 6 (5') All elytral intervals with setae. Head and pronotum narrow, elytra short, external angle with spine ..... *Colliurina* Liebke, 1930.
- 6' Intervals 2, 4 and 6 (also 8 in some specimens) glabrous, or with short pubescence, without erect setae ..... 7.
- 7 (6') Intervals 1, 3, 5, 7 and 9 with erect setae, and all interstices with short pubescence ..... *Anaplagiorhytis* Liebke, 1930.
- 7' Intervals without short pubescence; interval 8 glabrous. Pronotum and elytra narrow ..... *Apiodera* Chaudoir, 1848.
- 8 (3') Pronotum with row of long, lateral, erect setae ..... 9.
- 8' Pronotum without row of setae, only with single seta slightly before middle ..... 13.
- 9 (8) Only interval 3 setose ..... *Casnoniella* Liebke, 1938.
- 9' Elytron with setae on several intervals ..... 10.
- 10 (9') Intervals 3 and 5 with setae. Elytral striae clearly marked in anterior half ..... *Odacanthella* Liebke, 1930.
- 10' Intervals 3, 5 and 7 or 1, 3, 5 and 7, or 1, 3, 5, 7 and 9 with setae ..... 11.
- 11 (10') Terminal maxillary palpomere longer than penultimate palpomere. Darker, pronotum black ..... *Odacanthella* Liebke, 1930.
- 11' Terminal maxillary palpomere as long as penultimate palpomere. Head short behind eyes, with sulcus before neck ..... 12.
- 12 (11') Elytron with striae finely punctate, outer striae complete, internal striae erased. External intervals rugose, internal ones smooth ..... *Isocasnonia* Liebke, 1938.
- 12' Elytral intervals coarsely punctate, and complete. Microsculpture, if present, with fine marks, on all intervals ..... *Colliurita* Liebke, 1938.
- 13 (8') Elytron with setae on more than one interval ..... 14.
- 13' Elytron with setae on interval 3, only ..... 19.
- 14 (13) Setae on intervals 1, 3, 5 and 7; or on 1, 3 and 5; or on 3, 5 and 7 ..... 15.
- 14' Setae only on intervals 3 and 5 ..... 18.
- 15 (14) Terminal maxillary palpomere as long as penultimate palpomere ..... *Paracolliuris* Liebke, 1930.
- 15' Terminal maxillary palpomere longer than penultimate palpomere ..... 16.
- 16 (15') Elytron with setae on intervals 3, 5 and 7. Head short and spherical. Pronotum narrower than head. Elytral striae coarsely punctate ..... *Apoderella* Liebke, 1938.
- 16' Elytron with setae on intervals 1, 3, 5 and 7; those of first interval more

- 16' sparse and in many specimens only near scutellar stria. . . . . 17.  
 17 (16') Posterior part of head elongate, funnel-shaped. Pronotum fusiform, regularly thickened toward base . . . . . *Odacanthina* Liebke, 1938.  
 17' Posterior part of head short. Pronotum bottle-shaped, narrowest slightly in front of middle, and then abruptly widened . . . . . *Pseudoplagiorhytis* Liebke, 1930.  
 18 (14') Terminal maxillary palpomere shorter than penultimate palpomere. Mandibles long and narrow. Posterior part of head short, markedly constricted at base. Elytral intervals high and convex . . . . . *Plagiorhytis* Chaudoir, 1848.  
 18' Terminal maxillary palpomere longer than penultimate palpomere. Mandibles normal. Head large and elongate, posterior part funnel-shaped, regularly narrowed and not abruptly constricted. Elytron with external angle sharp; striae complete or incomplete, more erased at apex; intervals 3 and 5 with some setae . . . . . *Calocolluris* Liebke, 1938.  
 19 (13') Pronotum short and wide, almost as long as wide. Head with pedunculate neck . . . . . *Anapiodera* Liebke, 1938.  
 19' Pronotum much longer and narrower, at least 0.50 as long as wide . . . . . 20.  
 20 (19') Passage from head to neck without abrupt sulcus . . . . . 22.  
 21 (20') Posterior part of head abruptly narrowed, short; head more or less quadrate . . . . . *Colliurella* Liebke, 1938.  
 21' Posterior part of head elongate, funnel-shaped, dorsally shiny. Head and pronotum long and narrow . . . . . *Apioderina* Liebke, 1938.  
 22 (20') Posterior part of head semi-circular . . . . . *Pseudocasnonia* Liebke, 1930.  
 22' Posterior part of head semi-elliptic . . . . . *Microcasnonia* Liebke, 1938.

1. *Colliuris (sensu lato)* Degeer, 1774 (=*Casnonia* Latreille & Dejean, 1822; =*Ophionea* Klug, 1821). A worldwide genus, with about 100 Neotropical species. Adults of all species are small, winged, and most live in forests on vegetation. In two revisions Liebke (1930, 1938) recognized many subgenera, most of which will probably have to be suppressed when they are better studied.

1. 1. *Colliuris (sensu stricto)*. With five South American species, of which three are in Brazil (revision: Liebke, 1930: 669).  
 1. 2. *Colliurina* Liebke, 1930. Erected for four Brazilian species (revision: Liebke 1930: 664).  
 1. 3. *Apioderina* Chaudoir, 1848 (=*Procolliuris* Liebke, 1930). With four Neotropical species, three of which are from Brazil (revision: Liebke, 1930: 667).  
 1. 4. *Odacanthella* Liebke, 1930. With 14 Neotropical species, of which five are Brazilian.  
 1. 5. *Casnoniella* Liebke, 1938. With one Mexican and one Peruvian species.  
 1. 6. *Odacanthina* Liebke, 1938. With two Amazonian species (Brazil and Guiana), one from Panama and one from Cuba.  
 1. 7. *Calocolluris* Liebke, 1938. With five Neotropical species, one of which is from Brazil (revision: Liebke, 1938: 56).  
 1. 8. *Apioderina* Liebke, 1938. With six Neotropical species, three from Brazil (revision: Liebke, 1938: 56-57).  
 1. 9. *Mimocasnonia* Liebke, 1938. With three Neotropical species, one of which is from Brazil (revision: Liebke, 1938: 57).  
 1. 10. *Colliurella* Liebke, 1930. With 12 Neotropical species, of which seven are from Brazil (revision: Liebke, 1938: 58-59).  
 1. 11. *Pseudocasnonia* Liebke, 1930. With nine Neotropical species, three from Brazil (revision: Liebke, 1930: 666).  
 1. 12. *Colliurita* Liebke, 1938. With five Neotropical species, of which two are from Brazil (revision: Liebke, 1938: 70-71).  
 1. 13. *Anaplagiorhytis* Liebke, 1930. Monobasic for the Brazilian *Colliuris lugubris* Liebke, 1930.  
 1. 14. *Paracolluris* Liebke, 1930. Monobasic, for *Colliuris sipolisi* Oberthür, 1884, from Brazil.  
 1. 15. *Plagiorhytis* Chaudoir, 1848. With six Neotropical species, three from Brazil (revision: Liebke, 1930: 669).  
 1. 16. *Pseudoplagiorhytis* Liebke, 1930. With two species from Peru, Ecuador and Colombia (revision: Liebke, 1938: 72).

- 1.17. *Isocasnonia* Liebke, 1938. With one species in Central America and one in Brazil, the latter with two subspecies (revision: Liebke, 1938: 72).
- 1.18. *Apioderella* Liebke, 1938. Monobasic for *Colliuris rufa* Chaudoir, 1872, from Amazonas.
- 1.19. *Anapiodera* Liebke, 1938. Monobasic for *Colliuris bierigi* Liebke, 1938, from Panama.
- 1.20. *Odacanthomimus* Liebke, 1938. Monobasic, for *Colluris oglobini* Liebke, 1938, from Argentina.

2. *Calophaena* Klug, 1821 (=*Cordistes* Latreille & Dejean, 1822). A Neotropical genus including 46 species, half of which occur in Brazil. The species are predominantly Amazonian. Their habits seem to be the same as those of *Colliuris*, but in Central America adults are commonly found on the large leaves of *Heliconia* and *Calathea*. The species of *Calophaena* were revised by Liebke, (1930: 657 ff).

3. *Calophaenoidea* Liebke, 1930. Monobasic, from Ecuador.

Note: Liebke (1930: 657; 1938: 45) included in this tribe *Aporesthus* Bates, 1871. I prefer to follow Jeannel, placing the genus in the Perigonini (p. 415).

#### Tribe Ctenodactylini

Delimitation of this tribe of small carabids is relatively difficult, especially because of the confusion created by Liebke, who in a final revision of the group (1938) fused the Ctenodactylini and Odacanthini, as well as other groups which are actually unrelated (see also comments under Odacanthini (p. 434) and Lachnophorini (p. 413)).

Liebke (1928a and 1928b) revised this "subfamily", describing new genera and species. Later (1931) he presented a new key for identification of genera and description of new genera and species. Finally, in the 1938 revision, the group was revised on a worldwide basis.

The tribe, as considered here, is predominantly Neotropical, but some genera occur in the Old World, having been separated by Jeannel (1948: 759) in the Hexagoniini.

Practically nothing is known about way of life of the Neotropical species. Van Emden (1942: 51) described the larva of *Leptotrachelus*.

Identification, even of genera, is very difficult, and it is probable that many of Liebke's genera will not survive a careful study.

#### KEY TO GENERA OF NEOTROPICAL CTENODACTYLINI (ADULTS)

- |          |   |  |
|----------|---|--|
| 1        | Internal margin of eye with longitudinal carina . . . . .   | 2.                                     |
| 1'       | Internal margin of eye without carina . . . . .   | 3.                                     |
| 2 ( 1 )  | Tooth of mentum shorter. Mandibles pointed. Scutellum with obtuse apex and curved sides . . . . .   | <i>Leptotrachelus</i> Latreille, 1829. |
| 2'       | Tooth of mentum longer. Mandibles obtuse. Apex of scutellum sharp and sides straight . . . . .  | <i>Parapionycha</i> Liebke, 1929.      |
| 3 ( 1' ) | Tarsal claws pectinate . . . . .  | 4.                                     |
| 3'       | Tarsal claws simple, or each claw with single, small and obtuse or long and proclined tooth . . . . .   | 7.                                     |
| 4 ( 3 )  | Each tarsal claw with three long teeth. Middle tibia with internal tooth. Antenna flattened and widened from article 4. Elytra truncate . . . . .                                     | <i>Pseudometabletus</i> Liebke, 1930.  |
| 4'       | Each tarsal claw with eight long and sharp teeth. Middle tibia simple. Antenna weakly widened and flattened from article 5. Elytra not truncate, abdomen completely covered . . . . . | 5.                                     |
| 5 ( 4' ) | Antenna with scape very long, as long as articles 2-4 together. Ligula wide, truncate at apex. Elytron with microsculpture meshes transverse. Body markedly flattened . . . . .       | <i>Askalaphium</i> Liebke, 1938.       |
| 5'       | Antennal scape only 0.50 length of articles 2-4 together. Elytral micro-  |  |

- sculpture with meshes isodiametric. Body more convex ..... 6.
- 6 (5') Terminal maxillary and labial palpomeres fusiform and thin, truncate at apex. Anterior margin of labrum with six setae. Tarsus with dorsal surface pubescent. Lobes of tarsomere 4 widened toward apex. Elytral striae markedly punctate and impressed. Dorsally not or only faintly metallic ..... *Ctenodactyla* Dejean, 1825.
- 6' Terminal palpomeres fusiform and thick, rounded at apex. Anterior margin of labrum with four setae. Tarsi glabrous above. Lobes of tarsomere 4 not widened toward apex. Elytral striae finely punctate and weakly impressed, but complete. Dorsally markedly metallic ..... *Plagiotelum* Solier, 1849.
- 7 (3') Terminal labial palpomere clavate, thickened toward apex ..... 8.
- 7' Terminal labial palpomere fusiform, like that of maxillary palpus ..... 9.
- 8 (7) Terminal maxillary palpomere also clavate; all terminal palpomeres short and thick. Lateral margin of pronotum erased toward apex. Mentum with tooth. Elytron with apical margin rounded ..... *Wate* Liebke, 1928.
- 8' Terminal maxillary palpomere fusiform, truncate at apex; all palpomeres slender. Lateral margin of pronotum complete. Apex of elytron with long spine ..... *Oilea* Liebke, 1928.
- 9 (7') Sides of prosternum visible from above. Form short and depressed, very convex dorsally ..... *Alachnothorax* Liebke, 1929.
- 9' Sides of prosternum invisible from above. Body elongate, weakly convex, disc flattened or not ..... 10.
- 10 (9') Mentum without tooth ..... 11.
- 10' Mentum with tooth ..... 12.
- 11 (10) Tarsal claws strongly curved, not denticulate, only thickened at base. Labrum bi-emarginate in front, slightly projected in middle. Pronotum much longer than wide, conic, convex ..... *Pionycha* Chaudoir, 1848.
- 11' Tarsal claws slender, each with small tooth in middle. Anterior margin of labrum projected in middle. Pronotum as long as wide. Sides widened and curved ..... *Antipionycha* Liebke, 1928.
- 12 (10') Tarsal claws with thick, sharp tooth turned anterad ..... *Schidonychus* Klug, 1834.
- 12' Tarsal claw without large tooth, at maximum with small denticle ..... 13.
- 13 (12') Tarsal claws simple, without thickening or pectination ..... 14.
- 13' Tarsal claws thickened at base ..... 15.
- 14 (13) Tooth of mentum shorter than lateral lobes. Posterior part of head rounded. Elytra, each side of suture, flattened, truncate at apex, especially female ..... *Amblycoleus* Chaudoir, 1872.
- 14' Tooth of mentum as long as lateral lobes. Posterior part of head straight. Elytra weakly convex, not truncate ..... *Teukrus* Liebke, 1931.
- 15 (13') Ligula widely truncate at apex. Tarsal claws not pectinate ..... *Propionycha* Liebke, 1928.
- 15' Ligula narrowly truncate at apex. Tarsal claws thickened at base and each with small tooth in the middle ..... *Leptotrachelon* Liebke, 1928.

1. *Alachnothorax* Liebke, 1929. Monobasic, for *A. bruchi* Liebke, 1929, from Argentina and Paraguay.

2. *Leptotrachelus* Latreille, 1829 (=*Rhagocrepis* Eschscholtz, 1829; =*Odacantha* Perty,

1830; =*Sphaeracra* Say, 1834). With 32 Neotropical species, of which 19 are from Brazil; three species reach southern United States (revision of groups of some species in Liebke, 1928).

3. *Amblicoleus* Chaudoir, 1872. With four South American species, none of which are recorded from Brazil.

4. *Propionycha* Liebke, 1928. With two Argentinian species.

5. *Leptotrachelon* Liebke, 1928. Monobasic, for the Costa Rican *L. nevermanni* Liebke, 1928.

6. *Antipionycha* Liebke, 1928. Monobasic, for the south Brazilian *A. puncticollis* Liebke, 1928.

7. *Parapionycha* Liebke, 1929. Monobasic, for *P. lizeri* Liebke, 1928, from Bolivia.

8. *Teukrus* Liebke, 1931. With two Amazonian species, both from Brazil (key to species in Liebke, 1928: 121).

9. *Oilea* Liebke, 1931. Monobasic, for *O. spinalis* Liebke, 1931, from southern Brazil.

10. *Wate* Liebke, 1928. Monobasic, for *W. longinus* Liebke, 1928, described from "Brazil".

11. *Pionycha* Chaudoir, 1848. With three South American species, all known from Brazil.

12. *Schidonychus* Klug, 1834. Monobasic, for *S. brasiliensis* Klug, 1834, from Brazil and Argentina.

13. *Ctenodactyla* Dejean, 1825. With 10 South American species, of which seven are recorded from Brazil (key to species in Liebke, 1938: 124-125).

14. *Askalaphium* Liebke, 1938. Monobasic, for *A. depressum* (Bates, 1871), described from Brazil and Peru.

15. *Plagiotelum* Solier, 1849. Monobasic, for *P. irinum* Solier, 1849, the sole ctenodactyline known from Chile.

#### Tribe Lebiini

A markedly diverse tribe, especially numerous in the tropics, with some genera, as *Lebia* and *Calleida*, with hundreds of species. About 60 genera with nearly 1,000 species are known from the Neotropical Region (of which only about 300 species thus far are recorded from Brazil). No doubt these are provisional numbers. Recent revisions show that the number of undescribed species is extensive.

Because of its diversity, the taxonomic state of the tribe is chaotic, especially because it has not been studied as a whole in the Neotropics. Even the suprageneric classification is not yet definitely established. Most groupings have been proposed for restricted faunas, e.g. for France (Jeannel, 1942); Madagascar (Jeannel, 1949); Africa (Basilewsky, 1953); United States (Ball, 1960); Japan (Habu, 1967); and Canada (Lindroth, 1969a). Unfortunately there is no generally accepted system. The Neotropical genera deviate in certain characters, and do not fit easily into exotic systems. Many genera are monobasic, and have not been re-studied in recent years. Other genera, like those of the Calleidina, proposed by Liebke, are probably not natural, and are based on characters of difficult verification (mostly mouthparts).

Ball's recent revision of the subtribe Pericalina (1975), clearly shows the chaotic state of the tribe. In Ball's sense this subtribe includes groups such as the Mormolycini, and other groups segregated by Jeannel.

It also seems better to include here, even though provisionally, the genus *Nemotarsus*, which has been variously placed in Masoreini (p. 430) by several authors, but has been returned to Lebiini by Ball (1960: 157). The whole suprageneric system used here, however, is to be considered provisional. Many of the genera are placed in certain subtribes only because they have been placed there in catalogs like Csiki (1932b, 124). Their final position depends on future studies. For this reason it is also impossible, at this stage, to give a key to subtribes.

Patterns of life of members of Lebiini are most interesting, but little is known about the Neotropical representatives of the tribe. Adults are normally diurnal, brightly colored, frequently with metallic colors. Most members are small, but a few are relatively large (specimens of subgenus *Chelonodema* of *Lebia*, for example). Representatives of *Lebia* and *Calleida* are planticolous, living on herbs, shrubs and trees, and even in flowers; *Lebia* species (adults and larvae) are frequently associated with species of Chrysomelidae. Larvae of some exotic species of that genus are ectoparasitoids of pupae of Chrysomelidae. Larvae and adults of exotic species of *Calleida* are predators, some specialized on caterpillars of Noctuidae and Pyralidae. *Cymindis* and some *Apenes* adults are nocturnal, xerophytic species of sandy areas and sparse vegetation. During the day they hide under stones and under layers of vegetation. Van Emden (1942: 47-51) described larvae of some genera, very few from our Region.

#### Subtribe Lebidiina (=Galerucidiina)

A group whose adults have a characteristic habitus, resembling galerucine chrysomelids. Distribution is discontinuous: the genus *Lebidia* Morawitz, 1862 includes species from northern India, Taiwan and Japan; *Galerucidia* includes Neotropical species. Habu (1967) includes *Lebidia* in Callidina, without mentioning the separate status given this genus (together with *Galerucidia*) by most authors.

1. *Galerucidia* Chaudoir, 1872. With five Neotropical species, two of which are known from Brazil.

#### Subtribe Lebiina

In number of species this is the most diverse subtribe (about 500), more than 450 in the genus *Lebia* (*sensu lato*) alone, a cosmopolitan genus. Chaudoir (1870, 1871) monographed the group, arranging the species in several genera, which are usually accepted by the "French school". In a study of the Nearctic fauna, however, Madge (1967) placed most of Chaudoir's generic names in synonymy. This concept has been accepted in more recent years, e.g. by Lindroth (1969a) and Reichardt (1972d).

The taxonomic position of the South American "genera" thus depends on further studies. *Cryptobatis*, *Alkestis*, *Hyboptera* and *Asiasiola* have been placed in Physoderina by Csiki (1932b: 1346). Jeannel (1949: 882) restructured the groups, and restricted Physoderina to Indo-Malayan species. It seems, however, that *Cryptobatis* and *Hyboptera* are true Lebiina; *Alkestis* and *Asiasiola* are poorly known genera, but should probably be placed here as well.

2. *Lebia* Latreille, 1802. Probably one of the largest genera of Carabidae, of worldwide distribution, as has been seen above, and also very numerous in the Neotropics. According to Madge (1967: 148), the following subgenera are valid.

#### KEY TO SUBGENERA OF NEOTROPICAL *LEBIA* (ADULTS)

1	Front tibia without upper spur .....	<i>Lebia</i> ( <i>sensu stricto</i> ).
1'	Front tibia with upper spur .....	2.
2 ( 1' )	Disc of elytra metallic .....	<i>Loxopeza</i> Chaudoir, 1870.
2'	Disc of elytra non-metallic .....	<i>Chelonodema</i> Castelnau, 1835.

2. 1. *Lebia* (*sensu stricto*) (=*Metabola* Chaudoir, 1870; =*Aphelogenia* Chaudoir, 1870; =*Dianchomena* Chaudoir, 1870). Lindroth (1969: 1016) considers that *Lebia* s. str., *sensu* Madge, corresponds to subgenus *Poecilothais* Maindron, 1905. *Metabola*, *Aphelogenia* and *Dianchomena* have usually been considered as valid subgenera, but their names have been synonymized by Madge.

With this structure, this subgenus includes most species of the genus, about 415 of which over 100 have been recorded from Brazil.

Madge (1967: 147) also considers the following generic names as synonyms of *Lebia* s. str., but as the Neotropical species have not been studied in recent years, it seems preferable to list these as *incertae sedis*. [GEB]

*Grammica* Chaudoir, 1870. With three South American species, one of which is recorded from Brazil.

*Scythropa* Chaudoir, 1870. Monobasic, from Colombia.

*Cymatographa* Chaudoir, 1870. Monobasic, from Brazil.

*Ectomomes* Chaudoir, 1871. Monobasic, from French Guiana.

*Poecilstola* Chaudoir, 1870. With five South American species, of which four have been recorded from Brazil.

2. 2. *Loxopeza* Chaudoir, 1870. Restricted to the New World, with Nearctic and Neotropical species. There are 20 in the Neotropical Region, of which only three are recorded from Brazil.

2. 3. *Chelonodema* Castelnau, 1835 (=*Lia* Eschscholtz, 1829, in part). Restricted to the Neotropical Region, this group was usually considered a distinct genus (under the name of *Lia*). It includes 30 species, of which 25 are known from Brazil. Reichardt (1921d) revised it.

3. *Phaedrusium* Liebke, 1941. With two South American species, of which one is from Brazil. This genus is very enigmatic. Described as near *Lebia*, it may actually not belong here, as already mentioned elsewhere.

4. *Cryptobatis* Eschscholtz, 1829 (=*Aspasia* Dejean, 1831). A Neotropical genus with eight species, four of which are from Brazil. The species are not understood because of intense variability of adults; thus, possibly a few of the described forms are invalid.

5. *Alkestis* Liebke, 1939. Monobasic, and according to Liebke, is very close to *Cryptobatis*. The single species is from Costa Rica.

6. *Hyboptera* Chaudoir, 1872. With four species, all known from Brazil. Reichardt (1973a) revised the genus.

7. *Asiasiola* Chaudoir, 1877. A Neotropical genus with four species, of which two are known from Brazil.

#### Subtribe Calleidina (=Callidina)

Also a highly diverse subtribe of Lebiini (with 28 Neotropical genera), taxonomically complex in spite of a revision by Liebke (1935) with a key to genera. Mateu (1954) made comments on many of the mistakes in Liebke's revision, and others have also been noted by other authors. Nevertheless, his key is transcribed below. It is difficult to use, and may be wrong in places.

#### KEY TO GENERA OF NEOTROPICAL CALLEIDINA (ADULTS)<sup>1</sup>

1	Terminal palpomeres oval, not truncate at apices.....	2.
1'	Terminal palpomeres not oval; that of labial palpus more or less securiform .....	3.
2 ( 1 )	Scape of antenna very long, as long as articles 2-4 together. Tarsomeres short and wide .....	<i>Ogygium</i> Liebke, 1935.
2'	Antennal scape normal. Tarsomere 5 elongate-oval .....	<i>Callidadelpha</i> Steinheil, 1875.
3 ( 1' )	Mentum with tooth .....	4.
3'	Mentum without tooth .....	20.
4 ( 3 )	Ligula with four apical setae. Tarsomere 4 deeply emarginate, but not bilobed.....	5.
4'	Ligula with two apical setae.....	7.
5 ( 4 )	Tooth of mentum indicated by slight emargination .....	<i>Phacocerus</i> Chaudoir, 1872.
5'	Tooth of mentum well developed .....	6.

1. Calleidina genera erected after 1935 are not included in this key.

- 6 ( 5') Form elongate. Tarsomeres triangular ..... *Plochionus* Latreille & Dejean, 1824.
- 6' Elytra short, oval. Tarsomeres thick and wide, cordiform ..... *Amelus* Chaudoir, 1872.
- 7 ( 4') Tarsomere 4 bilobed. Tarsal claws denticulate ..... 8.
- 7' Tarsomere 4 not bilobed, but more or less incised ..... 14.
- 8 ( 7) Tarsomeres sulcate dorsally ..... 9.
- 8' Tarsomeres dorsally smooth ..... 11.
- 9 ( 8) Tarsomeres pubescent dorsally. Lateral margin of pronotum with series of erect setae ..... *Kteatus* Liebke, 1935.
- 9' Tarsomeres glabrous dorsally ..... 10.
- 10 ( 9') Terminal labial palpomere weakly securiform ..... *Euplatia* Chaudoir, 1872.
- 10' Terminal labial palpomere clearly securiform ..... *Calleida* Dejean, 1825.
- 11 ( 8') Tarsomeres pubescent dorsally. Labium wide at apex, with short and sharp projection in middle of apical margin. Terminal maxillary palpomere truncate ..... *Titaresius* Liebke, 1935.
- 11' Tarsi glabrous dorsally ..... 12.
- 12 (11') Elytra much widened posteriorly. Frons without carina next to internal margin of eyes. Dorsal surface dark metallic ..... *Spongoloba* Chaudoir, 1872.
- 12' Elytra parallel-sided. Frons with longitudinal carina next to internal margin of eyes. Dorsal surface yellow, with darker markings ..... 13.
- 13 (12') Ligula wide, sclerotized, rounded at apex. Paraglossae membranous, as long as glossae, jointly rounded, glabrous. Antenna long, antennomere 2 clearly shorter than 3, and all articles rounded. Legs relatively slender, tarsal claws thick, with five or six denticles ..... *Pontonoa* Liebke, 1935.
- 13' Ligula narrow, sclerotized, widened toward rounded apex; paraglossae membranous, as long as ligula, rounded at apex and finely pubescent. Scape of normal length; antennomere 2 slightly shorter than 3; remaining articles flattened and widened. Legs short and robust, tarsal claw with four denticles ..... *Epikastea* Liebke, 1935.
- 14 ( 7') Tarsal claw not pectinate ..... 15.
- 14' Tarsal claw pectinate. Tooth of mentum rounded, with lateral lobes ..... 16.
- 15 (14) Tarsomeres long, very slender. Elytra slender, widened in straight line posteriorly, or parallel-sided ..... *Cymindidius* Chaudoir, 1876.
- 15' Tarsomere short and wide. Elytra almost oval. Nearctic region ..... *Tecnophilus* Chaudoir, 1877.
- 16 (14') Terminal maxillary palpomere fusiform, elongate, with excavation near apex. Elongate form. Elytra widened in straight line posteriorly ..... *Callidula* Chaudoir, 1876.
- 16' Terminal maxillary palpomere without pre-apical excavation ..... 17.
- 17 (16') Tarsomeres glabrous and sulcate dorsally. Tarsomere 4 deeply emarginate. Tarsal claw with four denticles. *Calleida*-shaped ..... *Jalmenus* Liebke, 1935.
- 17' Tarsomeres not sulcate dorsally ..... 18.
- 18 (17') Tarsomeres pubescent dorsally. Shape of depressed *Calleida* ..... *Oechalius* Liebke, 1935.
- 18' Tarsomeres glabrous dorsally ..... 19.
- 19 (18') Tarsomeres slender. Dorsal surface smooth. (*Eurycallida* Maindron, 1905, unknown to Liebke, also runs here) ..... *Mimodromius* Chaudoir, 1873.

- 19' Tarsomeres wide. Dorsal surface densely punctate ..... *Philophuga* Motschulsky, 1859.
- 20 (3') Tarsomere 4 bilobed ..... 21.
- 20' Tarsomere 4 deeply emarginate ..... 24.
- 21 (20) Tarsomeres pubescent dorsally. Ligula with four apical setae ..... *Euproctinus* Leng & Mutchler, 1927.
- 21' Tarsomeres glabrous dorsally ..... 22.
- 22 (21') Tarsomeres sulcate dorsally ..... *Onota* Chaudoir, 1872.
- 22' Tarsomeres smooth dorsally ..... 23.
- 23 (22') Head and pronotum punctate. Form narrow. *Cylindronotum* Putzeys, 1846.
- 23' Head and pronotum smooth. Form short and wide ..... *Otoglossa* Chaudoir, 1872.
- 24 (20') Ligula with apical setae. Antenna strongly widened from antennomere 4 ..... *Phacocerus* Chaudoir, 1872.
- 24' Ligula with two apical setae. Antenna weakly widened from tarsomere 4 ..... *Teiresia* Liebke, 1935.
8. *Pontonoa* Liebke, 1935. Monobasic, described for *P. gounellei* Liebke, 1935, from Brazil.
9. *Titaresius* Liebke, 1935. Monobasic, based on *T. jeannelli* Liebke, 1935, from "Amer. mer.".
10. *Teiresia* Liebke, 1935. Monobasic, erected for the Brazilian *T. umbraculata* Liebke, 1935.
11. *Calleida* Dejean, 1825 (=*Callida auctt.*). A markedly diverse, cosmopolitan genus, with 171 Neotropical species, of which 47 are recorded from Brazil. Chaudoir (1872) revised the species known at the time, but many were described later, especially by Liebke.
- Some authors consider *Spongoloba* Chaudoir, 1872 congeneric with *Calleida*; others (Lindroth, 1969a: 1058) consider it a subgenus, apparently restricted to Nearctic species. *Philophuga* Motschulsky, 1859, has also been considered a distinct genus, for two Nearctic species of Mexico, but Lindroth (1969a) considers it a subgenus of *Calleida*.
12. *Jalmenus* Liebke, 1935. Closely related to *Calleida*, with four Brazilian species.
13. *Callidadelpha* Steinheil, 1875. Monobasic, from Colombia.
14. *Ogygium* Liebke, 1935. With two South American species, one of which is from Brazil.
15. *Euplatia* Chaudoir, 1872. With two South American species, one of which is from Brazil; and a third species, from Mexico.
16. *Eurycallida* Maindron, 1905 (=*Phaea* Chaudoir, 1872, *nec* Newman). Monobasic, from Brazil.
17. *Cylindronotum* Putzeys, 1846 (=*Stenonotum* Lacordaire, 1854; =*Micragra* Chaudoir, 1872). With seven Neotropical species, of which four are from Brazil. *C. aeneum* Putzeys, 1846, has a wide distribution, from northern South America to Texas.
18. *Straneotia* Mateu, 1961. With two Amazonian species, and related to *Otoglossa* and *Pseudotoglossa* (key to the three genera in Mateu, 1961: 162).
19. *Otoglossa* Chaudoir, 1872 (=*Heraldinum* Liebke, 1927). With two species in Brazil and one in Central America. Liebke, described *Heraldinum* for the Central American species, in the tribe Odacanthini; Reichardt (1964) synonymized the names.
20. *Pseudotoglossa* Mateu, 1961. Erected for species originally included in *Otoglossa* (in Liebke's key Mateu's genus probably runs into *Otoglossa*). The genus is Neotropical, with six known species, three of which are from Brazil. Mateu's key is difficult to use.
21. *Onota* Chaudoir, 1872 (=*Pseudolebia* Basilewsky, 1942, a genus erroneously described for a species wrongly labelled as from Madagascar). A complex genus, with very variable species; nine Neotropical species are known (and one occurs in Florida), of which seven are from Brazil (key to species in Maindron, 1906).

22. *Thoasia* Liebke, 1939. Monobasic (from Colombia and Brazil), possibly congeneric with the preceding *Onota*. Originally included in Pentagonalicini, the genus was maintained in that tribe by Reichardt (1968a: 147) but on account of the pectinate claws, the genus is certainly a lebiine.

23. *Plochionus (sensu lato)* Latreille & Dejean, 1824. With few species, mainly restricted to the Western Hemisphere, but includes one species from New Caledonia and one cosmopolitan. Two subgenera are recognized (key according to Ball, 1960: 91):

- |    |   |
|----|---|
| 1  | Tarsomere 4 bilobed, lobes longer than half length of tarsomere 4 . . . . .       |
|    | ..... <i>Menidius</i> Chaudoir, 1872.   |
| 1' | Tarsomere 4 emarginate, not bilobed . . . . . <i>Plochionus (sensu stricto)</i> . |

23.1. *Plochionus (sensu stricto)*. Includes two Neotropical species (both occurring in Brazil) plus one from New Caledonia.

23.2. *Menidius* Chaudoir, 1872. With 13 Neotropical species, two of which are known from Brazil.

24. *Phacocerus* Chaudoir, 1872. Monobasic, from Brazil.

25. *Amelus* Chaudoir, 1872. Monobasic, from French Guiana.

26. *Euproctinus* Leng & Mutchler, 1927 (=*Euproctus* Solier, 1849, *nec Gene*; = *Andrewesella* Csiki, 1932). A Neotropical genus which ranges into United States. There are 17 Neotropical species, of which one has been recorded from Brazil. Two species are Chilean.

27. *Epikastea* Liebke, 1935. Monobasic, from Costa Rica.

28. *Cyanotarus* Reed, 1874. A Chilean genus with two species.

29. *Callidula* Chaudoir, 1876. (\*) With three Chilean species, revised by Mateu (1954).

30. *Mimodromius (sensu lato)* Chaudoir, 1873. A southern-temperate and Andean genus, with about 35 species which occur especially in Argentina and Chile, but also in Bolivia, Peru and Ecuador. Mateu dedicated several papers to the genus, having described several subgenera and species (1955; 1959a; 1959b; 1960; 1964; 1970a; 1970b; 1970c). The species are placed in five subgenera (which are distinguished in keys by Mateu, 1970; 1970c), characterized especially by male and female genitalic structures. The following subgenera are recognized by Mateu:

30.1. *Mimodromius (sensu stricto)*, including 11 species.

30.2. *Gutierrezia* Mateu, 1955. With three species.

30.3. *Cobosia* Mateu, 1955. With 13 species.

30.4. *Cymindidius* Chaudoir, 1876. With five species.

30.5. *Boliviasia* Mateu, 1960. With two species.

31. *Mimodromites* Mateu, 1955. With two Argentinian species (placed in *Mimodromites s. str.*) and one Chilean (placed in the subgenus *Vianasia* Mateu, 1955).

32. *Apterodromites* Mateu, 1976c. Monobasic, with *A. saizi* Mateu, 1976 known only from Chile.

33. *Falsodromius* Mateu, 1976c. Monobasic, with *F. erythropus* Solier, 1849 known only from Chile.

34. *Oechalius* Liebke, 1935. Monobasic, from southern Brazil.

35. *Pylartesius* Liebke, 1939. Monobasic, from Argentina. Its systematic position is uncertain. In the description Liebke writes "Stimmt ganz mit *Cymindidius* Chaudoir (at present a subgenus of *Mimodromius*, see above) überein, mit Ausnahme des Lippentasterengliedes, dieses nicht beilformig, sondern spindelformig, an der Spitze abgerundet". Possibly the name is a synonym of one of the subgenera considered by Mateu.

36. *Kteatus* Liebke, 1935. Monobasic, from Argentina.

\* *Callidula* Chaudoir, 1876 is preoccupied by Hübner, 1819 (in Lepidoptera). Mateu and Négre have used *Chaudiorina* Mateu 1954 as a replacement name, but this name is not published in that paper, and I have been unable to locate it. It has not been listed in Zoological Record.

## Subtribe Dromiina

The genera which constitute this subtribe are better represented in temperate zones. In the Neotropical Region they are in Mexico, Central America and Chile, and only very few occur in tropical areas. The classification is not well understood and there are revisions of a few of the genera, only.

37. *Dromius* Bonelli, 1809. Mateu (1973) studied the Neotropical fauna, citing eight species, of which only one, *Dromius negrei* Mateu, 1973, occurs in Brazil. Species of *Dromius* are in all zoogeographic regions.

38. *Axinopalpus* LeConte, 1848 (= *Variopalpus* Solier, 1849; = *Axinopselaphus* Gemminger & Harold, 1868). A predominantly Nearctic genus, with 10 Neotropical species, one of which, *A. pusillus* (Dejean, 1831), is known from Colombia, Chile and Brazil.

39. *Oxoides* Solier, 1849. Monobasic, from Chile.

40. *Xenodromius* Bates, 1891. From Mexico, with six species (Mateu, 1976).

41. *Microlestes* Schmidt-Goebel, 1846 (= *Blechrus* Motschulsky, 1847; = *Bomius* LeConte, 1851; = *Dromius* Sloane, 1898). A cosmopolitan genus, with many Nearctic species, but few in the Neotropics. Mateu (1974) studied the Mexican species (five, some from the United States, with Mexican subspecies); one species is also known from Cuba.

42. *Carbonellia* Mateu, 1968. Monobasic, for *Microlestes platensis* Berg, 1883, from Argentina.

43. *Negrea* Mateu, 1968. Originally erected for a species from Colombia and Brazil, the genus was recently revised by Mateu (1975, 19: 63), and includes five species, two of which are known from Brazil and two from Mexico.

44. *Pseudocarbonellia* Mateu, 1972. Monobasic, near *Carbonellia*, described by Mateu (1972) for a Venezuelan species.

45. *Monnea* Mateu, 1970. Monobasic, erected for *Lebia decora* Steinheil, 1869, from Argentina and Uruguay (Mateu, 1970d). In the original description the position of the genus was uncertain, but in a later paper (1972) Mateu considered it as related to other Dromiina.

46. *Apristus* Chaudoir, 1846. A cosmopolitan genus, with five Middle American species.

## Subtribe Cymindina

A subtribe which is also not well understood taxonomically, without recent revisions. Six genera are represented in the Neotropical Region, one of which, *Cymindis*, is cosmopolitan.

Jeannel (1949: 878) indicated the existence of two groups of genera within the Neotropical Cymindina. In one, the palpi are glabrous or almost, with the terminal articles fusiform, obtuse at apex; and the terminal labial palpomere similar to that of the maxillary palpus. This first group only includes *Pinacodera* Schaum, 1857.

The second group has pubescent palpi, with the terminal maxillary palpomeres truncate at apex, and the terminal labial palpomere dilated and securiform. Included in this group are *Cymindis*, *Malisus*, *Apenes* and *Sphalera*.

The genera *Eucaerus* and *Lachnaces* are not mentioned by Jeannel.

47. *Pinacodera* Schaum, 1857 (= *Planesus* Motschulsky, 1864). A Nearctic genus, which ranges into Mexico and Guatemala, with eight species.

[*Cymindis* Latreille, 1806. A large, cosmopolitan genus, with several subgenera. In the New World it is, apparently, represented only by the subgenus *Cymindis* (*sensu stricto*) (= *Tarus* Clairville, 1806; = *Tarulus* Bedel, 1906), with several Nearctic species, of which four reach Mexico.]

48. *Apenes* (*sensu lato*) LeConte, 1851. A genus of extensive distribution in the Western Hemisphere, but predominantly Neotropical. In our Region, including the West Indies, 60 species are known, placed in three subgenera. Twenty one species, of which three are from

Brazil, remain unplaced in these subgenera.

48.1. *Apenes* (*sensu stricto*) (=*Sphenopalpus* Blanchard, 1853; =*Sphenopselaphus* Gemminger & Harold, 1868; = *Nominus* Motschulsky, 1864). This is the sole subgenus with representatives in United States. In the Neotropical Region it includes 12 species, of which three have been recorded from Brazil.

48.2. *Malisus* Motschulsky, 1864. With 19 species in the Neotropics, of which four are from Brazil.

48.3. *Didymochaeta* Chaudoir, 1875. With five Neotropical species, of which a single one has been recorded from Brazil.

49. *Sphalera* Chaudoir, 1873. With three South American species (two from Brazil), and a fourth species from Mexico. [GEB]

50. *Eucaerus* LeConte, 1853. With 11 Neotropical species, of which eight are known from Brazil. One species occurs in southern United States.

51. *Lachnaces* Bates, 1872. With two species from Brazil.

#### Subtribe Nemotarsina (=Nematotarsina of authors)

52. *Nemotarsus* LeConte, 1853 (=*Nematotarsus* Gemminger & Harold, 1868). With eight species in the Neotropical Region (of which four are known from Brazil), and one in southeastern United States. Adults of all species are very similar to one another, and extremely varied in extent of pale and dark color. Possibly there are fewer species than are accepted at present. Nothing is known of way of life of these species. Most adults have been collected at lights, at night.

This is the only genus included in the Nemotarsina. Placed by most authors among the Lebiini, the genus was transferred to Masoreini (as a monobasic subtribe of his Masoreitae) by Jeannel (1942a: 860), based especially on the long spur of the hind tibiae. I prefer to follow Ball (1960: 157-158) and Lindroth (1969a, 34: 1014) in placing it in Lebiini, in a subtribe of its own.

#### Subtribe Pericalina (=Coptoderina, =Catascopina, =Thyreopterina; including Mormolycini).

According to Ball's recent revision of the subtribe (1975), it includes some genera of uncertain position (like *Mormolyce* Hagenbach, 1825, in the past considered a distinct subfamily or tribe) and other genera previously distributed in different subtribes of Lebiini (or other tribes, like Agonina of Pterostichini).

The Neotropical species are included mostly in endemic genera, with very few species which range into southern United States. *Catascopus* and *Coptodera* are worldwide genera, with a few Neotropical representatives.

Little is known about habits of the Neotropical species; the only known larva apparently is that of *Eurycoleus*, which preys on cryptogramivorous endomychids (Erwin and Erwin, 1976).

According to Ball, *Stenognathus chaudoiri* Ball was collected under bark of trees, together with adults of several species of *Coptodera*, in tropical mountain forests in Mexico, at altitudes above 1,000 m. *Ochropisus concolor* Ball and *Phloeoxena geniculata* Bates occur in similar habitats. Mexican members of *Catascopus* were also found under bark of dead or partially dead trees. Adults of the Neotropical species of *Catascopus* seem to be nocturnal, while their Old World counterparts are diurnal. Adults of *Lelis* and adults and larvae of *Eurycoleus* are associated with fungi, under bark of trees.

KEY TO GENERA AND SUBGENERA OF NEOTROPICAL PERICALINA (ADULTS)  
(from Ball, 1975: 155-156)

- 1       Mentum with median tooth ..... 2.
- 1'       Mentum without median tooth ..... 13.
- 2 ( 1 ) Dorsal surface of body setulose. Pronotum with posterior margin lobulate ..... 3.
- 2'       Dorsal surface glabrous (with few long tactile setae, only). Pronotum with posterior margin truncate ..... 4.
- 3 ( 2 ) Color dark, elytra concolorous. Eyes reduced, head with prominent temporal lobes. Tarsal claws smooth ..... *Catascopellus* Straneo, 1969.
- 3'       Color pale, elytra bicolored. Eyes bulged, large; head without prominent temporal lobes. Tarsal claws pectinate ..... *Somotrichus* Seidlitz, 1887.
- 4 ( 2' ) Hind tibia with dorsal (outer) surface longitudinally canaliculate (one groove extended length of tibia) ..... 5.
- 4'       Hind tibia with dorsal surface rounded, smooth or longitudinally strigulose (numerous short irregularly spaced grooves and ridges), or keeled, but not canaliculate ..... 6.
- 5 ( 4 ) Tarsal claws smooth, not pectinate. Dorsum metallic green ..... *Catascopus* Kirby, 1825.
- 5'       Tarsal claws pectinate. Dorsum uniformly piceous or bicolored, not metallic ..... *Ochropusis* Bates, 1883.
- 6 ( 4' ) Elytron with microsculpture meshes approximately isodiametric, or longitudinal and parallel to long axis of body. Surface dull (most specimens), or shining (few specimens) ..... *Phloeoxena (sensu lato)* Chaudoir, 1869 ..... 8.
- 6'       Elytron with microsculpture meshes transverse, surface shining ..... 7.
- 7 ( 6' ) Pronotum with hind angles broadly rounded, without lateral setae ..... *Oreodicastes* Maindron, 1905.
- 7'       Pronotum with hind angles obtuse or rectangular, not broadly rounded.  
With two pairs of lateral setae ..... *Stenognathus (sensu lato)* Chaudoir, 1843 ..... 11.
- 8 ( 6 ) Elytron with humerus diagonally sloped, umbilical punctures about 20, in more or less continuous row; discal punctures three to nine ..... *Tacana* Ball, 1975.
- 8'       Elytron with humerus broadly rounded, umbilical series nine to 15 punctures, with more or less wide diastema medially; discal punctures two or three ..... 9.
- 9 ( 8' ) West Indian species ..... *Phloeoxena (sensu stricto)* (part).
- 9'       Mainland species ..... 10.
- 10 ( 9' ) Elytron with microsculpture meshes broad, adjacent ones in contact at margins, without linearly arranged narrow, high keels ..... *Oenaphelox* Ball, 1975.
- 10'       Elytron with microsculpture meshes narrow, high keels linearly arranged ..... *Phloeoxena (sensu stricto)* (part).
- 11 ( 7' ) Tarsal claws pectinate. Dorsal surface of hind tibia smooth ..... *Phloeotherates* Bates, 1869.
- 11'       Tarsal claws smooth, not pectinate. Dorsal surface of hind tibia longitudinally strigulose ..... 12.

- 12 (11') Elytron with lateral margin smooth, preapical angle rounded not toothed ..... *Stenognathus (sensu stricto)*.  
 12' Elytron with lateral margin serrate, preapical angle toothed ..... *Pristolomus* Chaudoir, 1869.  
 13 (1') Mentum with lateral lobes pointed or narrowly rounded apically. Mandibles slender, not explanate basally ..... 14.  
 13' Mentum with lateral lobes subtruncate apically. Mandibles moderately to strongly explanate basally ..... 15.  
 14 (13) Pronotum approximately truncate basally, not lobed. Hind tibia with dorsal surface keeled. Palpiger of labium with seta ventrally. Sternum VI (anal sternum) of abdomen narrowly notched apically ..... *Coptodera* Dejean, 1825.  
 14' Pronotum with base lobed medially. Hind tibia with dorsal surface rounded, not keeled. Palpiger of labium glabrous. Sternum VI of abdomen notched ..... *Stenoglossa* Chaudoir, 1848.  
 15 (13') Body very broad. Pronotum and elytra broadly explanate. Mandibles broadly explanate. Ligula with four or five setae. Paraglossae setose laterally ..... *Eurycoleus* Chaudoir, 1848.  
 15' Body narrower. Mandibles, pronotum and elytra not broadly explanate laterally. Ligula with two setae. Paraglossae glabrous ..... *Lelis* Chaudoir, 1869.

53. *Oreodicasites* Maindron, 1905 (=*Oxyglossus* Chaudoir, 1843, *nec* Swainson, 1827, *nec* Tschudi, 1838). This genus includes only two species from Brazil.

54. *Stenognathus (sensu lato)* Chaudoir, 1843. The 16 species are placed in three subgenera.

54.1. *Stenognathus (sensu stricto)*. Includes nine species distributed from northern South America to Mexico (three species are known from Brazil).

54.2. *Pristolomus* Chaudoir, 1869. Monobasic, from Colombia.

54.3. *Phloeotherates* Bates, 1869 (=*Ferus* Chaudoir, 1869). The six species are distributed from northern South America to Mexico (key to species in Maindron, 1906). Three species have been recorded from Brazil.

55. *Ochropitus* Bates, 1883. The three species range from Panama to Mexico (key to species in Ball, 1975: 165).

56. *Catascopus* Kirby, 1825. With more than 100 species in the Old World tropics. In the Neotropical Region only eight are known, all Middle American (two reaching into Mexico), except for one from southern Brazil and northern Argentina. According to Ball (1975), all Neotropical species belong to the subgenus *Catascopus (sensu stricto)*.

57. *Somotrichus* Seidlitz, 1887. Monobasic, its single species being cosmopolitan, and having been recorded from Guadeloupe and Brazil in the Neotropical Region.

58. *Catascopellus* Straneo, 1969. Monobasic, from Chile.

59. *Stenoglossa* Chaudoir, 1848. With eight species which live in Brazil (six), Colombia and Mexico.

60. *Lelis* Chaudoir, 1869. With six species distributed from northern South America to Mexico (one is known from Brazil).

61. *Eurycoleus* Chaudoir, 1848. With seven species which live in Brazil (three), northern South America to Mexico, recently revised by Reichardt (1972a). Erwin (1975b) and Erwin and Erwin (1976) observed a species in fungi whose larvae prey on endomychids.

62. *Coptodera* Dejean, 1825. According to Ball the Neotropical species belong to the nomotypical subgenus. There are about 40 South and Central American-Antillean species, and a few in the southern United States. Nineteen have been recorded from Brazil. Jeannel (1949: 924) arranged the species in several genera, and placed a single Venezuelan species in the otherwise Madagascan genus *Haplocrepis* Jeannel, 1949. Ball (1975) does not mention this genus.

63. *Phloeoxena (sensu lato)* Chaudoir, 1869. With 16 species, (revised by Ball, 1975: 178), and placed in three subgenera.

63.1. *Tacana* Ball, 1975. Monobasic for one Guatemalan-Mexican species.

63.2. *Phloeoxena (sensu stricto)*. With seven species in the Greater Antilles and four in Central America.

63.3. *Oenaphelox* Ball, 1975. A subgenus erected to include four species distributed from Central America to the southern United States. A fifth species was described subsequently (Ball, 1976).

#### Tribe Dryptini

As restricted by Jeannel (1949: 1063), excluding the Galeritini, it is a moderately diverse tribe, distributed in the tropics of the Old World.

In the New World it is represented by an endemic genus only, *Neodrypta* Basilewsky, 1960, with a single, rare, Amazonian species, *N. costigera* (Chaudoir, 1861).

#### Tribe Galeritini (=Galeritinini, =Planetini)

A moderately diverse, pan-tropical tribe. It was segregated from the Dryptini by Jeannel (1949: 1057), but this action was not accepted by all recent authors (Darlington, 1971 uses Dryptini in the old sense).

The Western Hemisphere Galeritini were studied by Reichardt (1967a). In this Hemisphere the tribe is predominantly Neotropical, only the genus *Progaleritina* occurring as far north as southern Canada.

Larvae of Neotropical forms (van Emden, 1942: 51-52, 80) are very active, having been captured in forests, usually under leaves or stones. Reichardt (1971b) recorded "bombarding" habits in *Galerita corumbana* Liebke, 1932; the same habit was more recently observed in *Galerita collaris* Dejean, 1826. *Galerita occidentalis* (Olivier, 1795), however, does not show this habit.

Basilewsky (1963: 23), considered the group as a subfamily, and arranged the species in two tribes. Both groups are represented in the Neotropics.

#### KEY TO GENERA OF NEOTROPICAL GALERITINI (ADULTS)

- |        |   |  |
|--------|---|--|
| 1      | Elytron with setigerous puncture near scutellum; margin with four setigerous punctures, each with long seta. Size small, length of body about 10 mm. <i>Planetina</i> . . . . .                 | <i>Ancystroglossus</i> Chaudoir, 1862. |
| 1'     | Elytron without setigerous puncture near scutellum, and without marginal setiferous punctures. Length of body more than 15 mm. <i>Galeritina</i> . . . . .                                      | 2.                                     |
| 2 (1') | Scape of antenna with two parallel rows of setae on ventral face. Base of maxilla with large tubercle, with erect setae . . . . .   | <i>Trichognathus</i> Latreille, 1825.  |
| 2'     | Antennal scape normally pubescent. Base of maxilla without tubercle . . .   | 3.                                     |
| 3 (2') | Elytron striate-punctate, with plane interstices, each with six to eight irregular rows of reddish setae . . . . .  | <i>Progaleritina</i> Jeannel, 1949.    |
| 3'     | Elytron carinate; carinae reduced or not, but visible, even if vestigial. Intervals with or without two longitudinal carinulae, and with or without two to four rows of reddish setae . . . . . | <i>Galerita</i> Fabricius, 1801.       |

#### Subtribe Planetina

1. *Ancystroglossus* Chaudoir, 1863 (=*Ancistroglossus auctt.*). A Neotropical genus with six species which occur from Mexico to southern Brazil and Paraguay (four are known from Brazil).

*A. punctatus* Reichardt, 1967, was collected in rotting wood (Estacao Biológica de Boracéia, São Paulo).

#### Subtribe Galeritina

2. *Progaleritina* Jeannel, 1949. A predominantly Nearctic genus, which penetrates into Mexico, Central America (as far south as Costa Rica) and the Antilles. Ball (1960: 91, 163) does not accept segregation of the North American species from *Galerita*; Lindroth (1969: 1090) considers *Progaleritina* as a subgenus of *Galerita*.

Of the eight known species, one occurs in the Greater Antilles, and five live in Mexico and Central America.

3. *Galerita* Fabricius, 1801 (=*Galeritula* Strand, 1936; =*Galeritina* Jeannel, 1949). The genus is cosmopolitan (and synonyms from other faunas are not listed). Eight species are Oriental, 17 African (including Madagascar) and 52 Neotropical. In the Neotropics the species occur from Mexico and southeastern United States (Brownsville, Texas) to northern Argentina. Twenty four species have been recorded from Brazil.

4. *Trichognathus* Latreille, 1825. Monobasic, restricted to South America. Reichardt (1964: 52) synonymized names of three described species, considering the latter variants of *T. marginipennis* Latreille, 1829, recorded from most South American countries, including Brazil.

#### Tribe Zuphiini

As delimited in Csiki (1932b: 1562-1571), it is a very heterogeneous tribe. *Planetes* M'Leay, 1825, belongs in the Galeritini; the Neotropical species of *Polystichus* Bonelli, 1809, actually belong to a distinct genus, *Dailodontus* Reiche, 1842, which together with *Helluomorpha* Castelnau, 1840, has been removed to Helluonini (Reichardt, 1974b). *Pseudaptinus* Castelnau, 1835, *Thalpius* LeConte, 1851 (treated by most authors as a subgenus of *Pseudaptinus*) and *Mischocephalus* Chaudoir, 1862, have been transferred from "Dryptini" to Zuphiini (Reichardt, 1967) and *Metaxidius* Chaudoir, 1852, placed traditionally among the Helluonini, actually belongs in the Zuphiini (Reichardt, 1972a: 265).

Adult zuphiines are small-sized carabids, which apparently live in humus. Only Old World larvae are known.

Of the three known subtribes, only the Leluphidiina are not represented in our Region. The tribe is worldwide in distribution, but is apparently predominant in the New World.

#### KEY TO SUBTRIBES AND GENERA OF NEOTROPICAL ZUPHIINI (ADULTS)

- |          |  |   |
|----------|--|---|
| 1        | Maxillary palpomeres similar to labial palpomeres . . . . .  | Zuphiina, <i>Zuphium</i> Latreille, 1806. |
| 1'       | Maxillary palpomeres long and thick, with large terminal article; labial palpomeres short and thin, with small apical article . . . . .                              | Patriziina . . . . . 2.                   |
| 2 ( 1' ) | Neck very narrow (more or less as wide as diameter of one eye). Pronotum much constricted posteriorly, and with long and strong spine each side, near base . . . . . | <i>Mischocephalus</i> Chaudoir, 1862.     |
| 2'       | Neck thick (wider than diameter of one eye). Pronotum narrowed or not posteriorly, but if with spines or sharp basal angles, these small, poorly developed . . . . . | 3.  |
| 3 ( 2' ) | Pronotum without spine or sharp basal angles .   | <i>Pseudaptinus</i> Castelnau, 1835.      |
| 3'       | Pronotum with sharp basal angles . . . . .   | 4.  |

- 4 (3') Antennal socket limited above and below by sharp carina, inferior carina better developed than superior one (clearly visible from above); antennal scape relatively shorter (slightly shorter than antennomeres 2 to 4 together). Pronotum as long as wide posteriorly, with anterior angles more or less sharp, and posterior angles sharp, almost square.  
 Pronotum and elytra glabrous ..... *Metaxidius* Chaudoir, 1852.
- 4' Antennal socket with superior carina as developed as inferior carina; antennal scape relatively longer (as long or longer than antennomeres 2 to 4 together). Pronotum longer than wide; anterior angles rounded; posterior angles more or less spiniform or not. Pronotum and elytra pubescent ..... *Thalpius* LeConte, 1851.

#### Subtribe Zuphiina

1. *Zuphium* Latreille, 1806 (=*Zophium* Gistl, 1839; =*Zoyphium* Motschulsky, 1850). A genus with pan-tropical distribution, including Australia (56 species in the Old World, according to Csiki, 1932: 1562). In the New World the genus occurs from the United States to Argentina, 20 Neotropical species being known of which only four are recorded from Brazil. Identification of the species is difficult, in spite of a key (Liebke, 1933: 461-463).

#### Subtribe Patriziina

2. *Pseudaptinus* Castelnau, 1835 (=*Diaphorus* Dejean, 1831). Exclusively American, with a few species in the United States, and a total of 16 Neotropical species, of which five are known from Brazil. The genus also occurs in the Antilles. Liebke (1934: 372-388) presents a key to the species (including *Thalpius*).

3. *Thalpius* LeConte, 1851 (=*Enaphorus* LeConte, 1851; =*Zuphiosoma* Castelnau, 1867). Frequently considered a subgenus of *Pseudaptinus*, *Thalpius* has a disjunct distribution, with one Australian species (for which Castelnau proposed the genus *Zuphiosoma*), and the remaining species in the New World, ranging from the southern United States to Argentina, including the Antilles. Nineteen species occur in the Neotropics, of which six are in Brazil (key in Liebke, 1934).

4. *Mischocephalus* Chaudoir, 1862. Monobasic, for *M. spinicollis* Chaudoir, 1862, from Amazonia and northwestern South America.

5. *Metaxidius* Chaudoir, 1852. Monobasic for *M. brunnipennis* Chaudoir, 1852, described with doubt as from South America, and as a helluonine. Reichardt (1972b: 267) recognized it as a zuphiine. Recently the species has been collected at Montevideo, Uruguay, confirming its South American origin.

#### Tribe Helluonini

A moderately diverse tribe, with pan-tropical distribution, and with few temperate species. The limits of the tribe have been established, but its relationships remain obscure. Certain structures of the mouthparts of adults suggest relationships with the Eucheilini, an endemic Neotropical tribe. The group is possibly also related to the Physocrotaphini (=Helluodini), known only from southeast Asia and Australia.

Reichardt (1974b) arranged the species in two subtribes, Helluonina, restricted to Australia and New Guinea, and Helluomorphina, with Old and New World representatives.

Little is known about habits of the New World species. Reichardt (1974b: 221-222) summarized the information. As adults, a few species seem to prey on ants and termites; others have been collected in arboricolous bromeliads (in Mexico and São Paulo).

Larvae (and pupae) of Neotropical species are unknown.

KEY TO GENERA OF NEOTROPICAL HELLUONINI (ADULTS)

- 1 Front tarsomeres of male with double row of adhesive setae asymmetrically placed in relation to median line. Tarsomere 4 slightly emarginate . . . . . 2
- Front tarsomeres of male with double row of adhesive setae placed symmetrically in relation to median line. Tarsomere 4 slightly emarginate or distinctly bilobed . . . . . 3.
- 2 Tibia flattened. Elytral intervals with double row of setiferous punctures near striae. Scutellum impunctate and glabrous . . . . . *Helluomorpha* Castelnau, 1840.
- Tibia not flattened. Elytral intervals with several irregular rows of setiferous punctures. Scutellum punctate and pubescent . . . . . *Dailodontus* Reiche, 1842.
- 3 Labrum transverse, anteriorly truncate or arcuate, anterior margin curved or with slight angle in middle, without tooth or anterior projection. Maxillary palpomeres similar to labial palpomeres . . . . . *Helluomorphoides* Ball, 1951.
- Labrum not transverse, with median tooth or projection, or with median and two smaller, lateral teeth. Maxillary palpomeres glabrous and better developed than labial palpomeres . . . . . 4.
- 4 Labrum with median tooth and conspicuous denticle on each side. Middle tarsomeres 2 and 3 of male without adhesive setae . . . . . *Pleuracanthus* Gray, 1832.
- Labrum with conspicuous median tooth or conspicuous median projection. Some males with adhesive setae on tarsomeres 2 and 3 of middle legs . . . . . *Helluobrochus* Reichardt, 1974.

1. *Helluomorpha* Castelnau, 1840 (=*Herinnis* Thomson, 1857; =*Erynnis*, emend.). Basically South American (with one species recorded from Panama), including four species, all known from Brazil and neighboring countries, but not occurring in Argentina.

2. *Dailodontus* Reiche, 1842 (=*Polystichus* Bonelli, 1809, pars). The two species now included in this genus were placed by most authors in the Palaearctic *Polystichus*, a genus of Zuphiini. The two South American species, of very wide distribution, have been recorded from Brazil. Possibly they are only color variants of a single species.

3. *Helluomorphoides* Ball, 1951 (=*Helluomorpha* Castelnau, 1840, pars). A moderately diverse genus, apparently with disjunct distribution: seven species are Nearctic (revision by Ball, 1956), occurring in the United States, Mexico and Guatemala; and 15 species which have been placed in three species groups are Neotropical. Fourteen of the Neotropical species (12 known from Brazil) are exclusively South American, and one, with distinct South American relationships, is only known from Mexico. Adults of the latter and of one species from southeastern Brazil have been taken in arboricolous bromeliads.

4. *Pleuracanthus* Gray, 1832 (=*Ocyphus* Gistl, 1839). A South American genus, with four species, three recorded from Brazil.

5. *Helluobrochus* Reichardt, 1974. The species are arranged in four groups, each predominantly South American in distribution. A single species, *H. cibratus* (Reiche, 1842) occurs in northern South America, Central America and southern Mexico. The other 25 species are South American, of which 22 have been recorded from Brazil. Morphologically, adults of some of the species are interesting because they have adhesive setae on middle tarsomeres of

males. Adults of *Helluobrochus bacchus* (Reichardt, 1972) were collected in nests of *Camponotus rufipes* (see Reichardt, 1972c, 16: 49-52); and *H. anthracinus* (Klug, 1834) adults were collected under termite mounds.

### Tribe Eucheilini (=Euchilini; =Periglossini)<sup>1</sup>

As discussed above under Agriini, this tribe is of doubtful status. Apotypic features of the defense mechanism indicate clear relationship to the Lebiomorphi, especially Lebiini. The mouthparts, similar in structure to some Helluonini, that have been used to show relationships to that group are found only in members of *Eucheila* (2 species) and not in *Inna*. Stressing these autoapotypic features without regard to all the group's members has led to an inflated ranking. However, until the definitive studies now underway are published this classification is conserved.

This exclusively Neotropical and southern Nearctic group of beetles ranges from southern Texas (two species) to northern Argentina. Adults of both genera are quite *Calleida* or *Apenes*-like in form with rugose and densely punctured elytra and pronotum. The labrum of *Inna* adults is long and narrow like some *Coptodera* (Pericalina) and the ligula is moderately large. Members of *Eucheila* have inflated labra and the ligula is huge. Members of *Eucheila* also have moderately pectinate claws which indicates they climb vegetation at least in part. *Inna* claws are simple. Nothing is known of the habits or larvae of these beetles although labels indicate some specimens were "beaten" from trees and others came to lights.

Reichardt (1966b) provided a generic synopsis of the group with keys to genera and to species of *Eucheila*. *Inna* is at present in need of complete revision; identification of specimens to species is impossible without recourse to type material. Liebke's (1929b) *Periglossum nevermanni* is an *Inna* species and this name was properly synonymized by Reichardt (1966b).

### KEY TO GENERA OF EUCHEILINI (from Reichardt, 1966b)

- 1      Labrum convex, apices of mandibles covered, and with short setae along lateral margins. Lateral margins of pronotum smooth, not crenulate. Pronotum with only basal pair of setae. Tarsal claws pectinate . . . . . *Eucheila* Dejean, 1829.  
       Labrum plane, apices of mandibles uncovered, and with four setae along front margin, two longer setae almost at lateral angle, and series of short, lateral setae. Lateral margins of pronotum crenulate. Pronotum with two pairs of marginal setae. Tarsal claws simple . . . *Inna* Putzeys, 1863.

1. *Eucheila* Dejean, 1829 (=*Eucheyla* and *Euchila* auct.). With only two species, both described from Brazil, and one also occurring in Argentina (key to species in Reichardt, 1966:10).

2. *Inna* Putzeys, 1863 (=*Periglossum* Liebke, 1929). A genus with very wide distribution, occurring from Texas to Argentina. No species is known from the Antilles. Eleven species are known, of which three are recorded from Brazil. As suggested by Reichardt (1966b: 14), it is possible that many of the described forms are conspecific with one another, but doubtless there are many more new species yet to be discovered.

### Subfamily Pseudomorphinae

A predominantly Australian subfamily (five genera), but also with one genus in the Oriental Region, one in Africa, and one in the Western Hemisphere. Notman (1925) published a world-wide revision of the group, in which the genera are clearly delimited.

1. [TLE]

Most authors have considered the Pseudomorphini as a distinct subfamily, because of its very special characters. In recent years only Crowson (1955: 5, 6) did not give them a special treatment, apparently including them in the Harpalinae, together with Brachininae, which are also considered a distinct subfamily by most authors.

The genus which occurs in the Western Hemisphere is *Pseudomorpha* Kirby, 1825 (=*Heteromorpha* Kirby, 1825; =*Axinophorus* Dejean & Boisduval, 1829; =*Drepanus* Dejean, 1831), which includes 20 species in the United States and Mexico, one in Haiti and six in Brazil and Argentina. Ogueta (1967) studied the Argentine fauna, including in his revision material from Brazil. Ogueta (1967: 230) also settled the status of *Pseudomorpha confusa* Notman, 1925, originally described from Australia, but which actually is an Argentinian species.

Little is known about habits of Pseudomorphinae. Moore (1964), who described the first larva of the subtribe (of the Australian genus *Sphallomorpha*), described also the habits of adults of certain Australian genera, frequently found in association with ants. The larva was collected in brood chambers of *Iridomyrmex*. There are few references about species of *Pseudomorpha*. Ogueta (1967: 230) refers to a specimen of *P. lacordairei* (Dejean & Boisduval, 1829), collected in a termite nest in Sete Logoas, Minas Gerais. Lenko (1972) collected larvae (in cocoons), pupae and adults of *P. laevissima* Chaudoir, 1852 in nests of the ant species *Camponotus rufipes* in Barueri, São Paulo. The larva of *Pseudomorpha*, only briefly described by Lenko, is similar to that of *Sphallomorpha*. According to Moore (1964: 246), larval characters of this group stress separation of Brachininae and Pseudomorphini in Balteifera, as originally suggested by Jeannel (1942a: 1102).

### Subfamily Brachininae

A subfamily usually separated from the remaining carabids because of the number of normally visible abdominal sterna of adults. All other carabids have six, but brachinine females have seven and males have eight. This structure is correlated with the "bombarding" mechanism, i.e., the capacity to eject volatile substances through a small opening in front of the tergum IX. The larger number of exposed segments permits more mobility of the abdomen, permitting the directioning of the jet of volatile substance to a determined target (Eisner, 1958).

Because of this defense mechanism of adults, Brachininae are known as "bombardier beetles". This behavior, however, is not restricted to this subfamily, having been recorded for other tribes as well (e.g. *Galerita*, see p. 447). There is also an old reference that Helluonini adults have this capacity, but this has not been confirmed in recent years (Reichardt, 1974b: 221-222). For Neotropical species the only published reference on bombarding behavior is that of Reichardt (1971), who recorded it for *Pheropsophus aequinoctialis* and *P. rivieri*. It is, however, known that both *Pheropsophus* and *Brachinus* adults are true barbeders.

Erwin (1970) considered this subfamily as a division, Brachinida, with the genera arranged in two tribes, Crepidogastrini (restricted to the southern parts of Africa and India, and Brachinini (worldwide in distribution).

### Tribe Brachinini

This is the only tribe of Brachininae represented in the New World. Erwin (1970) recognized four subtribes, of which the Mastacina and the Aptinina are Old World. Only Pheropsophina and Brachinina have Neotropical representatives, each with a single genus.

Larvae and pupae of three Old World species are known. For the New World, Erwin (1967, 1972b) described way of life and development of *Brachinus pallidus* Erwin, 1965, from California, and summarized what is known about way of life of the group. *B. pallidus* larvae develop on pupae of Hydrophilidae (genera *Tropisternus* and *Berosus*). According to Erwin the

"ectoparasitoidism" is obligatory for post-embryonic development, at least in the North American species of *Brachinus*.

KEY TO GENERA AND SUBGENERA OF NEOTROPICAL BRACHININI (ADULTS)  
(from Erwin, 1970)

- |        |   |   |
|--------|---|---|
| 1      | Mandibular scrobe plurisetose . . . . .             | <i>Brachinus</i> ( <i>Neobrachinus</i> Erwin, 1970).            |
| 1'     | Mandibular scrobe unisetose . . . . .               | <i>Pheropsophus</i> ( <i>sensu lato</i> ) Solier, 1833 . . . 2. |
| 2 (1') | Front coxal cavities narrowly open behind . . . . . | <i>Protopheropsophus</i> Hubenthal, 1911.                       |
| 2'     | Front coxal cavities closed behind . . . . .        | <i>Pheropsophus</i> ( <i>sensu stricto</i> ).                   |

1. *Brachinus* Weber, 1801 (=*Brachynus auct.*). A cosmopolitan genus, with many species, placed in several subgenera. All Western Hemisphere species have been placed in subgenus *Neobrachinus* Erwin, 1970. This subgenus ranges from Canada to Argentina (but seems to be absent from Chile). Several of the Mexican species occur in the United States as well. Very few of the typically South American species occur in Central America. The Neotropical fauna is very poorly known, and the status of the described species is uncertain. Twenty four species are known from South America, many from Argentina and Uruguay; 11 have been recorded from Brazil.

2. *Pheropsophus* (*sensu lato*) Solier, 1833. According to Erwin (1970), this genus is endemic to the Neotropical Region, being especially South American (one species is known from Mexico, and one of the South American species occurs as far north as Mexico).

2.1. *Protopheropsophus* Hubenthal, 1911. A monobasic subgenus from Mexico, *P. biplagiatus* Chaudoir, 1876 has apterous adults.

2.2. *Pheropsophus* (*sensu stricto*) (=*Pheropsophidius* Hubenthal, 1911). Erwin (1971a) discusses nomenclatorial problems relative to genera and subgenera. At present the group includes six species (and 12 varieties), of which only two have not been recorded from Brazil. *P. aequinoctialis* (Linnaeus, 1763), is the species with widest distribution (from Argentina to southern Mexico and Antilles), and adults are highly varied in color (most known "varieties" belong to this species). *P. platycephalus* Reichardt, 1967, from northeastern and eastern Brazil, is the only apterous species of the subgenus. Externally adults resemble those of *P. biplagiatus*, but do not belong to *Protopheropsophus* (Erwin, in litt.).

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G.E. Ball

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**Index to Names of Taxa**  
**(Junior Synonyms and Junior Homonyms are in Italics)**

**SPECIES**

- aeneum Putzeys, *Cylindronotum*, 441  
 aequatoriensis Wasmann, *Eohamopterus*, 378  
 aequinoctialis Linnaeus, *Pheropsophus*, 453  
 aequinoctialis Reichardt, *Pheropsophus*, 452  
 affine Chaudoir, *Chrysostigma*, 383  
 amariodes Motschulsky, *Metius*, 411  
 americana Darlington, *Lymnastis*, 399  
 angulatum angulicolle Chaudoir,  
     *Carabosoma*, 383  
 angulatum Chevrolat, *Carabosoma*, 383  
 anomalus Bates, *Cyrtolaus (Ithytolus)*, 407  
 antarcticus Reed, *Tachysarus*, 423  
 antennatus Bates, *Liotachys*, 399, 415  
 anthracinus Klug, *Helluobrochus*, 450  
 antigua Erwin, *Polyderis*, 399  
 aptera Ball & Erwin, *Loricera*, 384  
 arenaria LeConte, *Disamara*, 415  
 argentinense Csiki, *Castrida*, 383  
 argillacea Hubner, *Alabama*, 383  
 armata Castelnau, *Coptia*, 404  
 atrovirens Chaudoir, *Callitropa*, 383  
 australis Schweiger, *Creobius*, 396  
 batesi Chaudoir, *Neohiletus*, 353, 384  
 bembidioides Kirby, *Sericoda*, 412  
 bicolor Brullé, *Ochtozetus*, 401  
 bierigi Liebke, *Colliuris*, 435  
 binotatus Casey, *Stendophus*, 426  
 biplagiatus Chaudoir, *Protopherupsophus*, 453  
 bispinosa Olivier, *Monacis*, 378  
 blaptoides Putzeys, *Calopachys*, 383  
 brachus Reichardt, *Helluobrochus*, 451  
 brasiliense Dejean, *Morion*, 405  
 brasiliensis Klug, *Schidonychus*, 437  
 brasiliensis Négre, *Neohiletus*, 353, 384  
 brevis Solier, *Systolosoma*, 375  
 bridgesi Chaudoir, *Calosoma*, 381, 383  
 bruchi Liebke, *Alachnothorax*, 436  
 brunnipenis Chaudoir, *Metaxidius*, 449  
 californicus Ménétries, *Stenomorphus*, 429  
 carnifex Dejean, *Antarctia*, 411  
 carnifex Fabricius, *Abropus*, 411  
 catenulatus Chaudoir, *Oribazus*, 409  
 centenarius Carvalho, *Eohomopterus*, 378  
 chaudoiri Ball, *Stenognathus*, 444  
 chihuahuae, *Notiophilus*, 384  
 chilensis Solier, *Harpalus*, 424  
 collaris Dejean, *Galerita*, 447  
 comma Fabricius, *Stenolophus*, 426  
 complanatus Dejean, *Pristonychus*, 413  
 concolor Ball, *Ochropisus*, 444  
 confusa Notman, *Pseudomorpha*, 452  
 cordatum Chaudoir, *Morion*, 405  
 corumbana Liebke, *Galerita*, 447  
 costatum Chevrolat, *Clinidium*, 394  
 costatus LeConte, *Dicaelus*, 421  
 costigera Chaudoir, *Neodrypta*, 447  
 cibratus Reiche, *Helluobrochus*, 450  
 decora Steinheil, *Lebia*, 443  
 dejeani Chaudoir, *Polychaetus*, 419  
 derbesi Solier, *Bembidion*, 400  
 depressum Bates, *Askalaphium*, 437  
 distinctus Haldeman, *Micrixys*, 404  
 dominicensis Chaudoir, *Omophron*, 378  
 (Edaphonpaussus) americanus, Kolbe,  
     *Paussus*, 378  
 egregius Chaudoir, *Polychaetus*, 419  
 eydouxi Guérin, *Creobius*, 396  
 fallaciosa Chevrolat, *Pycnochila*, 372  
 fallax Olivier, *Chlaenius*, 417  
 falvipes mexicanus Van Dyke, *Badister*, 421  
 flavostriata Reichardt, *Chaetogenys*, 408  
 forrei Bates, *Carabus*, 384  
 frugiperda Smith, *Spodoptera*, 383  
 fryi Schaum, *Nototylus*, 375  
 fuscus Solier, *Eutogencius*, 421  
 galapegium Hope, *Castrida*, 383  
 geniculata Bates, *Phloeoxena*, 444  
 georgiae Palisot, *Morion*, 405  
 gigas, *Enceladus*, 351  
 glabratum Dejean, *Camedula*, 383  
 gounellei Biebke, *Pontonoa*, 441  
 granatense Grechin, *Castrida*, 383  
 granulatum Perty, *Calosoma*, 381, 383  
 granulatus, *Say*, *Stomis*, 407  
 grossus *Say*, *Euryderus*, 428

- guentheri Wasmann, *Coeloxenus*, 377, 379  
 hendrichsi Bolicar, *Carabus*, 384  
 hispaniolae Darlington, *Tachyta*, 399  
 horni Bruch, *Cicindis*, 375  
 hylacis Say, *Gynandropus*, 428  
 insitatus Erwin, *Costitachys*, 399  
 integripennis Bates, *Anillus*, 397  
 irinum Solier, *Plagiotalum*, 437  
 isthmiacus Motschulsky, *Metius*, 411  
 jeanneli Liebke, *Titaressus*, 441  
 jeanneli Négre, *Migadops*, 386  
 johnbeckeri Bänninger, *Cicindis*, 375  
 Lacoardairei Dejean & Boisduval,  
     *Pseudomorpha*, 452  
 laevipennis flohri Bates, *Dicaelus*, 421  
 laevipennis LeConte, *Dicaelus*, 421  
 laevissima Chaudoir, *Pseudomorpha*, 452  
 lateritium Négre, *Systolosoma*, 375  
 leluporum Basilewsky, *Castrida*, 383  
 linelli Mutchler, *Castrida*, 383  
 lizeri Liebke, *Parapionycha*, 437  
 longinus Liebke, *Wate*, 437  
 longula Bates, *Antrichis*, 419  
 lugubris Liebke, *Colliuris*, 434  
 major LeConte, *Diplocheila*, 421  
 manni Darlington, *Stenomorphus*, 429  
 marginalis Casey, *Camegonia*, 383  
 marginipennis Latreille, *Trichognathus*, 448  
 menevillei Chaudoir, *Chlaenius*, 417  
 mexicanus Bates, *Dercylodes* (*Dercylodes*)  
     420  
 mexicanus Van Dyke, *Micrixys*, 404  
 motschulskyi Csiki, *Metius*, 411  
 nana inornata Say, *Tachyta*, 399  
 négrei Mateu, *Dromius*, 443  
 nevermanni Liebke, *Leptotrachelon*, 437  
 nicki van Emden, *Anisotarsus*, 421  
 nigrita Motschulsky, *Metius*, 411  
 occidentalis Olivier, *Galerita*, 447  
 ocellata Reichardt, *Asklepia*, 399  
 ocellatus Whitehead, *Schizogenius*, 351,  
     391  
 oglobini Liebke, *Colliuris*, 435  
 orientale Dejean, *Morion*, 405  
 ovalpennis Straneo, *Monolobus*, 386  
 ovipennis Putzeys, *Calathus*, 413  
 pallidus Erwin, *Brachinus*, 452  
 palmeri Horn, *Callitropa*, 383  
 panamensis Laferté, *Panagaeus*, 404  
 parumcostatus Fairmaire, *Rhysodiastes*, 394  
 piceus, LeConte, *Psydrus*, 395  
 picipennis Westwood, *Melisodera*, 395  
 picipes Motschulsky, *Metius*, 411  
 platensis Berg, *Microlestes*, 443  
 platycephalus Reichardt, *Pheropsophus*, 453  
 punctatus Reichardt, *Ancystroglossus*, 448  
 puncticollis Liebke, *Antipionycha*, 437  
 punctulatus Haldeman, *Pasimachus*, 387  
 punctulatus Putzeys, *Athrostictus*, 428  
 pusillus Dejean, *Axinopalpus*, 443  
 pygmaeus Dejean, *Nomius*, 394, 395  
 reflexus LeConte, *Baudia*, 421  
 reicheellum Csiki, *Bembidion*, 401  
 retusum Fabricius, *Castrida*, 383  
 rivieri Reichardt, *Pheropsophus*, 452  
 rotundangulus Bates, *Anisodactylus*, 424  
 rotundicollis Chaudoir, *Loricerini*, 384  
 rудis Chaudoir, *Colliuris*, 435  
 rufipes Reichardt, *Camponotus*, 352, 451  
 rufus Brullé, *Anisotarsus*, 424  
 rugatifrons Chevrolat, *Meisus*, 390  
 sallei Chaudoir, *Pasimachus*, 388  
 sallei scapularis Bänninger, *Pasimachus*, 388  
 sayi Dejean, *Castrida*, 383  
 schaefferi, *Aztecarpalus*, 428  
 scrutator Fabricius, *Calodrepa*, 383  
 sculptile Newman, *Clinidium*, 393  
 semicarinatus, *Scarites*, 352  
 semirufa Casey, *synuchus* 411  
 scotosa Chaudoir, *Physea*, 352, 377  
 sexdens, *Atta*, 352, 377, 431  
 simplex Moore, *Scopodes*, 431  
 sipolisi Oberthür, *Colliuris*, 434  
 specularis Bates, *Noyiophilus*, 384  
 spinalis Liebke, *Oilea*, 437  
 spinicollis Chaudoir, *Mischocephalus*, 449  
 splendida Gistl, *Eurusoma*, 404  
 steinbachi Kolbe, *Homopterus*, 378  
 striatopunctata, *Diplocheila*, 421  
 subiridescens Chaudoir, *Trichopselaphus*, 429  
 sulcatum Guerin, *Pelecium*, 429  
 sulcatus Chaudoir, *Craptocerus*, 352, 407  
 sulcatus Fabricius, *Rhysodes*, 393  
 tarsalis, *Pseudoxycbeila*, 372  
 testaceus Solier, *Monolobus*, 386  
 tuberculatus Chaudoir, *Macracanthus*,  
     (*Ophryognathus*), 431  
 umbraculata Liebke, *Teiresia*, 441

validus Chaudoir, *Anisocnemus*, 429  
 vandykei Ball, Badister, 421  
 virescens Chaudoir, *Tropopsis*, 377  
 viridis Dejean, *Tetragonoderus*, 431  
 wilcoxi LeConte, *Calodrepa*, 383

## GENERALA

*Abaridius* Chaudoir, 409  
*Abaris* Dejean, 409  
*Abarys* Gemminger & Harold, 409  
*Abropus* Waterhouse, 411  
*Actenonyx* White, 431  
*Acupalpus*, 422  
*Acupalpus* Latreille, 425, 426  
*Acupalpus* Thomson, 426  
*Adialampus* Gozis, 389  
*Adrimus* Bates, 408  
*Aemalodera* Solier, 402  
*Aephnidius* MacLeay, 430  
*Aepomorphus* Jeannel, 402  
*Agaosoma* Ménétries, 429  
*Agonina*, 361  
*Agonoderus* Dejean, 426  
*Agonum*, 395, 412  
*Agonum* Bonelli, 412  
*Agonum* (*s. st.*), 412  
*Agra* Fabricius, 361, 368, 431  
*Agraphoderes* Bates, 410  
*Agridia* Chaudoir, 431  
*Agrius* Chevrolat, 372  
*Akephorus* LeConte, 390  
*Alachnothorax* Liebke, 436  
*Alkestis* Liebke, 438, 439  
*Allendia* Noonan, 423, 424  
*Allotriopus* Bates, 409  
*Amara*, 415  
*Amara* Bonelli, 361, 367  
*Amara* (*s. lat.*) Bonelli, 415  
*Amara* (*s. st.*), 415  
*Amblicoleus* Chaudoir, 437  
*Amblycoleus* Chaudoir, 436  
*Amblygnathus* Dejean, 427, 428  
*Amelus* Chaudoir, 440, 442  
*Ammosia* Westwood, 372  
*Amphitasus* Bates, 413  
*Anadaptus* Casey, 425  
*Anaferonia* Casey, 410  
*Anapiodera* Liebke, 434, 435  
*Anaplagiorhytis* Liebke, 433, 434

*Anatrichis*, 418  
*Anatrichis* (*s. lat.*) LeConte, 419  
*Anatrichis* (*s. st.*), 419  
*Anaulacus* MacLeay, 430  
*Anchomenus* Bonelli, 412  
*Anchonoderus* Reiche, 413  
*Ancistroglossus* *auct.*, 447  
*Ancus* Putzeys, 391  
*Ancystroglossus* Chaudoir, 447, 448  
*Andrewesella* Csiki, 442  
*Aniara* Hope, 372  
*Aniaria* Horn, 372  
*Anisocnemus* Chaudoir, 427, 429  
*Anisodactylus* Dejean, 425  
*Anisostichus* van Emden, 423, 424  
*Antarctia* Dejean, 411  
*Antarctiola* Straneo, 411  
*Antarctobium* Tschitscherine, 410  
*Antarctonomus* Chaudoir, 385, 386  
*Antilliscaris* Bänninger, 389  
*Antiperyphanes* Jeannel, 401  
*Antiperyphus* Jeannel, 400  
*Antipionycha* Liebke, 436, 437  
*Antroforceps* Barr, 389, 392  
*Apenes*, 438  
*Apenes* (*s. lat.*) LeConte, 443  
*Apenes* (*s. st.*), 444  
*Aphelogenia* Chaudoir, 438  
*Apionera* Chaudoir, 433, 434  
*Apiederella* Liebke, 433, 435  
*Apiederina* Liebke, 434  
*Apoesthus* Bates, 416, 435  
*Apotomus* Illiger, 359, 365, 394  
*Apristhus* Chaudoir, 443  
*Apsaustodon* Tschitscherine, 409  
*Arathymus* Guérin, 396  
*Arctoclinidium* Bell, 393, 394  
*Ardistomis*, 386, 392  
*Ardistomis* Putzeys, 392  
*Ardistomis* (*s. st.*), 386, 392  
*Ardistomiellus* Kult, 347  
*Aretaonus* Liebke, 414  
*Argutoridius* Chaudoir, 410  
*Arthropteropsis* Kolbe, 378  
*Arthropterus*, 376  
*Arthrostictus* *auct.*, 428  
*Askalaphium* Liebke, 435, 437  
*Asklepia* Liebke, 414, 415  
*Aspasia* Dejean, 439

- Aspasiola* Chaudoir, 438, 439  
*Aspidoglossa*, 386  
*Aspidoglossa* Putzeys, 392  
*Asporina* Castlenau, 420  
*Athrostictus* Bates, 427, 428  
*Atta*, 22  
*Augasmosomus* Chaudoir, 429  
*Aulacinia* Thomson, 392  
*Austronotaphus* Jeannel, 400  
*Axinopalpus* LeConte, 443  
*Axinophorus* Dejean & Boisduval, 452  
*Axinopselaphus* Gemminger & Harold, 443  
*Axylosius* Liebke, 414  
*Aztecarpalus* Ball, 427, 428  
*Badister* Clairville, 420, 421  
*Badister* (*s. lat.*) Clairville, 420  
*Badister* (*s. st.*), 420, 421  
*Barypus* Dejean, 395, 396  
*Barypus* (*s. st.*), 396  
*Barysomus* Dejean, 427, 429  
*Barytachys* Chaudoir, 399  
*Basoleia* Westwood, 405  
*Batrachion* Chevrolat, 424  
*Baudia* Ragusa, 420, 421  
*Bembidarenas* Erwin, 401  
*Bembidiomorphum* Champion, 394, 395, 400  
*Bembidion* (*s. lat.*) Latreille, 400  
*Bembidium* *auct.*, 400  
*Berosus*, 452  
*Blaptasoma* Behin, 382, 383  
*Blechrus* Motschulsky, 443  
*Bledius*, 390  
*Blemus* LeConte, 399  
*Blennidus*, 410  
*Blennidus* Motschulsky, 410  
*Bolivariidius* Straneo, 412  
*Boliviasia* Mateu, 442  
*Boliviocnides* Mateu & Nègre, 403  
*Bomius* LeConte, 443  
*Bothriopterus* Chaudoir, 410  
*Bothynoproctus* Tschitscherine, 407  
*Brachinus* Weber, 453  
*Brachinus* (Neobrachinus Erwin), 453  
*Brachycoelus* Chaudoir, 386  
*Brachygynathus*, 403, 404, 407  
*Brachygynathus* Perty, 403, 404  
*Brachynus* *auct.*, 453  
*Brachystilus* Chaudoir, 409  
*Bradycellus* (*Liocellus*) Motschulsky, 425  
*Bradycellus* (*Stenocellus*) Casey, 425  
*Bradycellus* (*s. lat.*) Erichson, 426  
*Brasiella* Rivalier, 374  
*Calathus* Bonelli, 413  
*Caletor* Tschitscherine, 407  
*Calleida* Dejean, 437, 438, 440, 441  
*Callida* *auctt.*, 441  
*Callidadelpha* Steinheil, 439, 441  
*Callidemra* Guérin, 372  
*Callidula* Chaudoir, 440, 442  
*Callistriga* Motschulsky, 383  
*Callitropa* Motschulsky, 382, 383  
*Calocolliuris* Liebke, 434  
*Calodrepa* Motschulsky, 381, 383  
*Calopachys* Haury, 382, 383  
*Calophaena* Klug, 432, 435  
*Calophaeniodea* Liebke, 433, 435  
*Calosoma*, 380, 381  
*Calosoma* (*s. lat.*), 380  
*Calosoma* Weber, 380  
*Caludema* Jeannel, 383  
*Calybe* Castelnau, 414  
*Camedula* Motschulsky, 382, 383  
*Camegonia* Lapouge, 381, 383  
*Camptidius* Putzeys, 389, 390  
*Camptodontus* Dejean, 390  
*Camptotoma*, 408  
*Camptotoma* Reiche, 408  
*Camptotoma* (*s. st.*), 408  
*Carabomimus* Kolbe, 382, 383  
*Carbonellia* Mateu, 443  
*Carabosoma* Gehin, 381, 383  
*Carabus* Linnaeus, 380, 383  
*Cardiophthalmus* Curtis, 396  
*Caris* Fischer, 371  
*Cascellius* Curtis, 396  
*Casnonia* Latreille & Dejean, 434  
*Casnoniella* Liebke, 433, 434  
*Castrida* Motschulsky, 380, 381, 382, 383  
*Catapiesis* Solier, 405  
*Catascopellus* Straneo, 445, 446  
*Catascopus* Kirby, 444, 445, 446  
*Catascopus* (*s. st.*), 446  
*Catastriga* Lapouge, 383  
*Celia* Zimmermann, 415  
*Celiamorphus* Casey, 428  
*Cenothyla* Rivalier, 370, 374  
*Centrocheila* Lacordaire, 372

- Ceratoglossa* MacLeay, 391  
*Ceroglossus* Solier, 380, 383  
*Chaetauchenium* Tschitscherine, 410  
*Chaetocrepis* Chaudoir, 418  
*Chaetogenys*, 408  
*Chaetogenys* van Emden, 408  
*Chalybe* Lacordaire, 414  
*Chaudiorina* Mateu, 442  
*Cheilonycha* Lacordaire, 370, 374  
*Cheiloxia* Guérin, 371  
*Cheiloxya* Guérin, 372  
*Chelonodema* Castelnau, 438  
*Chilonycha* auct., 374  
*Chiloperyphus* Jeannel, 401  
*Chiloxia* auct., 372  
*Chlaenius* Bonelli, 417  
*Chlaenius* s. st., 417  
*Chrysobracteon* Netolitzky, 400  
*Chrysostigma* Kirby, 382, 383  
*Cicindela* Linnaeus, 373, 374  
*Cicindelidia* Rivalier, 374  
*Cicindis* Bruch, 357, 375  
*Cicindosa* Motschulsky, 374  
*Climax* Putzeys, 391  
*Clinidium* (s. lat.) Kirby, 393  
*Clinidium* (s. st.), 393, 394  
*Clivina* (s. st.), 391  
*Clivina* Latreille, 391  
*Clivinina* Latreille, 347  
*Cnemacanthus* auct., 395, 416  
*Cnemacanthus* Brullé, 416  
*Cnemacanthus* Gray, 416  
*Cnemalobus* Guérin, 360, 366, 395, 416  
*Cnides* Motschulsky, 402, 403  
*Cobosia* Mateu, 442  
*Coelozenus* Wasmann, 377  
*Colliurella* Liebke, 434  
*Colliurina* Liebke, 433, 434  
*Colliuris* Degeer, 432  
*Colliuris* (s. lat.) Degeer, 432, 434  
*Colliuris* (s. st.), 433, 434  
*Colliurita* Liebke, 433, 434  
*Colpodes*, 412, 413  
*Colpodes* MacLeay, 412  
*Cophognathus* Waterhouse, 372  
*Coptia* Brullé, 404  
*Coptodera* Dejean, 444, 446  
*Cordistes* Latreille & Dejean, 435  
*Costitachys* Erwin, 398, 399  
*Cratocara* LeConte, 426  
*Cratognathus* Perty, 426  
*Cragocerus*, 407  
*Cragocerus* Dejean, 361, 367, 407  
*Creobius* Guérin, 396  
*Criniventer* van Emden, 424  
*Crosscrepis* Chaudoir, 418, 419  
*Crossonychus* Chaudoir, 431  
*Cryptobatis* Eschscholtz, 438, 439  
*Cryptomma* Putzeys, 391  
*Ctenodactyla* Dejean, 436, 437  
*Ctenostoma* Klug, 355, 363, 371  
*Curtonotus* Stephens, 415  
*Cyanotarus* Reed, 442  
*Cyclolopha* Casey, 400  
*Cyclotrachelus* Chaudoir, 410  
*Cylindera* s. st., 374  
*Cylindera* Westwood, 374  
*Cylindronotum* Putzeys, 441  
*Cylloscelis* Curtis, 426  
*Cymatographa* Chaudoir, 439  
*Cymindidius* Chaudoir, 440, 442, 443  
*Cymindis* Latreille, 438, 443  
*Cymindis* s. st., 443  
*Cynthia* Latreille, 407  
*Cynthidia*, 409  
*Cynthidia* (s. lat.) Chaudoir, 409  
*Cynthidia* s. st., 409  
*Cyrtolaus*, 406  
*Cyrtolaus* Bates, 361, 367  
*Cyrtolaus* (s. lat.) Bates, 406  
*Cyrtolaus* (s. st.), 407  
*Dailodontus* Reiche, 448, 450  
*Dercylodes* Chaudoir, 420  
*Dercylus* (s. lat.) Laporte, 419  
*Dercylus* s. st., 420  
*Dianchomena* Chaudoir, 438  
*Diaphorus* Dejean, 449  
*Dicaelus* Bonelli, 420  
*Dicaelus* (s. lat.) Bonelli, 421  
*Dicaleus* (s. st.), 421  
*Didetus* LeConte, 431  
*Didymochaeta* Chaudoir, 444  
*Diplacanthogaster* Liebke, 413  
*Diplocampa* Bedel, 400  
*Diplochaetus* Chaudoir, 401  
*Diplocheila* Hope, 374  
*Diplochila* Brullé, 421  
*Diploharpus* Chaudoir, 416

- Disamara Lindroth, 415  
*Dischistus* Portevin, 388  
*Discoderus* LeConte, 427, 428  
*Disphaericus* Waterhouse, 429  
*Distichus*, 405  
*Distichus* Motschulsky, 388, 389  
*Dischistus* Portevin, 389  
*Dormeyeria* Enderlein, 401  
*Drepanus* Dejean, 452  
*Dromica* Dejean, 370  
*Dromius* Bonelli, 443  
*Dromius* Sloane, 443  
*Dromochorus* Guérin, 374  
*Dromochorus* s. st., 374  
*Dyschiridium* Waterhouse, 429  
*Dyschiridius* Jeannel, 390  
*Dyschirius*, 386, 390  
*Dyschirius* Bonelli, 387, 390  
*Dyschirius* (s. lat.) Bonelli, 391  
*Dyschirius* (s. st.), 390  
*Dyschromus* Chaudoir, 407  
*Eciton*, 405  
*Ectomomesa* Chaudoir, 439  
*Ega* Castelnau, 414  
*Eidocompsus* Erwin, 400  
*Elaphropus* Motschulsky, 398, 399  
*Elliptoptera* Doktourow, 374  
*Elliptoleus* Bates, 413  
*Emydopterus*, 387  
*Emydopterus* Lacordaire, 388  
*Enceladus* Bonelli, 359, 365, 379  
*Eohomopterus* Wasmann, 378  
*Enaphorus* LeConte, 449  
*Enceladus* Bonelli, 384  
*Eotachys* Jeannel, 399  
*Epikastea* Liebke, 440, 442  
*Eripus* Dejean, 429  
*Erynnis* emend., 450  
*Eucaerus* LeConte, 444  
*Eucallia* Guérin, 370, 371, 372  
*Eucheila* Dejean, 362, 368, 451  
*Eucheyla* auct., 451  
*Euchila* auct., 451  
*Euchroa* Brullé, 407  
*Eulampra* Chaudoir, 374  
*Eumara* Tschitscherine, 409  
*Eunota* Rivalier, 374  
*Eupalamus* Motschulsky, 347, 391  
*Euphorticus* Horn, 414  
*Euplatia* Chaudoir, 440, 441  
*Euproctinus* Leng & Mutchler, 441, 442  
*Euproctus* Solier, 442  
*Euprosopus* Dejean, 370, 373  
*Eurycallida* Maindron, 440, 441  
*Eurycoleus* Chaudoir, 444, 446  
*Eurydactylus* Laferté, 417  
*Euryderus* LeConte, 427, 428  
*Euysoma* Dejean, 404  
*Euysoma* Gistl, 404  
*Euysomides* Strand, 404  
*Eurytrichus* LeConte, 424  
*Eutany* Tschitscherine, 410  
*Eutogeneius* Solier, 420, 421  
*Evarthrus* LeConte, 410  
*Feronia* Latreille, 409  
*Feronia* Putzeys, 396  
*Feroniola* Tschitscherine, 409  
*Feroniomorpha* Solier, 410  
*Ferus* Chaudoir, 446  
*Forcipator* Maindron, 389, 390  
*Galerita* Fabricius, 447, 448  
*Galeritina* Jeannel, 448  
*Galeritula* Strand, 448  
*Gallerucidia* Chaudoir, 438  
*Gehringia* Darlington, 375  
*Genioschizus* Whitehead, 391  
*Geobius* Dejean, 404  
*Geocharidius* Jeannel, 397  
*Geta* Putzeys, 405  
*Gipsyella* Schweiger, 403  
*Glyptoderus* Laferté, 417  
*Glyptogrus* Bates, 388  
*Glyptolenus*, 413  
*Glyptolenus* Bates, 413  
*Glyptogaster* Chaudoir, 389  
*Glyptoglenus* Bertkau, 413  
*Glyptogrus* Bates, 389  
*Glyptomorphus* Motschulsky, 389  
*Goniocellus* Casey, 426  
*Goniotropis* Gray, 377  
*Gonoderus* Motschulsky, 409  
*Grammica* Chaudoir, 439  
*Gutierrezia* Mateu, 442  
*Gynandropus* Dejean, 428  
*Habropus* auct., 411  
*Habroscelimorpha* Doktourow, 374  
*Halocoryza* Alluaud, 391  
*Haplobothynus* Tschitscherine, 407, 409

- Haplocoelus* Chaudoir, 409  
*Haplocrepis* Jeannel, 446  
*Harpalus* Latreille, 427, 428  
*Helluobrochus* Reichardt, 450  
*Helluomorpha* Castelnau, 450  
*Helluomorpha* Castelnau, 448, 450  
*Helluomorphoides* Ball, 450  
*Hemiplatynus*, 412  
*Hemiplatynus* Casey, 412  
*Hemisopalpus* Casey, 428  
*Heraldinium* Liebke, 441  
*Herinnis* Thomson, 450  
*Heteromorpha* Kirby, 452  
*Hiletus* Schiödte, 384  
*Holcogaster* Chaudoir, 389  
*Hologaeus* Ogueta, 404  
*Hololissus* Mannerheim, 405  
*Holoprizus* Putzeys, 392  
*Homalodera* auct., 402  
*Homaloderodes* Jeannel, 402  
*Homalomorpha* Brullé, 405  
*Homopterus* s. lat., 378  
*Homopterus* s. st., 378  
*Homopterus* Westwood, 378  
*Hyboptera* Chaudoir, 439  
*Hybothecus* Chaudoir, 410  
*Hygroduvalius* Bolivar, 403  
*Hyperpes* Chaudoir, 409  
*Ictinus* Castelnau, 377  
*Inna* Putzeys, 362, 368, 451  
*Iresia* Dejean, 370, 373  
*Iridomyrmez*, 452  
*Isocasnonia* Liebke, 433, 435  
*Isorembus* Jeannel, 420, 421  
*Isotachys* Casey, 399  
*Ithytolus* Bates, 406, 407  
*Jalmenus* Liebke, 440, 441  
*Kenodactylus* Broun, 402  
*Kteatus* Liebke, 440, 442  
*Kushelinus*, 410  
*Kuschelinus* Straneo, 411  
*Lachenus* Putzeys, 391  
*Lachnaces* Bates, 444  
*Lachnophorus* (s. lat.) Dejean, 414  
*Lachnophorus* (s. st.), 414  
*Laemosthenes* Schaufuss, 413  
*Langea* Horn, 373  
*Lebia*, 437, 438  
*Lebia* Latreille, 438  
*Lebia* (s. lat.), 438  
*Lebia* (s. st.), 438  
*Lebidia* Morawitz, 438  
*Leiotachys* Jeannel, 399  
*Leistus*, 408  
*Lelis* Chaudoir, 444, 446  
*Leptotachys* Jeannel, 399  
*Leptotomus* Gahan, 431  
*Leptotrachelon* Liebke, 436  
*Leptotrachelus* Latreille, 435, 436  
*Lia* Eschscholtz, 439  
*Licinodercylus* Kuntz, 420  
*Liocellus* Motschulsky, 426  
*Liocaelus* Casey, 421  
*Lioscarites* Maindron, 389  
*Liotachys* Bates, 398, 399  
*Lissopterus* Waterhouse, 385, 386  
*Listropus*, 391  
*Listropus* Putzeys, 386, 391  
*Lobobrachus* Sharp, 407  
*Lophogenius* Motschulsky, 389  
*Loricera*, 408  
*Loricera* Latreille, 359, 365, 384  
*Loxandrus* LeConte, 408  
*Loxopeza* Chaudoir, 438  
*Luperca* Castelnau, 384  
*Lynnastis*, 397  
*Lynnastis* auct., 399  
*Lynnastis* Motschulsky, 398, 399  
*Macracanthus* Chaudoir, 347, 430  
*Macracanthus* (s. lat.) Chaudoir, 430  
*Macracanthus* s. st., 431  
*Macroprotus* Chaudoir, 418, 419  
*Malisus* Motschulsky, 444  
*Marsyas* Putzeys, 409  
*Masoreus* Dejean, 347  
*Mecyclothorax* Sharp, 395  
*Megacephala* Latreille, 372  
*Megalostylus* Chaudoir, 408  
*Melanotus* Dejean, 426  
*Menidius* Chaudoir, 442  
*Meotachys* Erwin, 399  
*Meraulax* Tschitscherine, 410  
*Merizodus* Solier, 401  
*Meropalpus* Tschitscherine, 409  
*Mesacanthina* Rivalier, 374  
*Mesochila* Rivalier, 374  
*Mesus* Chevrolat, 390  
*Metabola* Chaudoir, 438

- Metabola* Chaudoir, 438  
*Metallina* Motschulsky, 400  
*Metaxidius* Chaudoir, 448, 449  
*Metius* Curtis, 410, 411  
*Metoncidus* Bates, 408  
*Metopon* Fleutiaux, 370, 374  
*Metrocheila* Thomson, 372  
*Mexanillus* Taglianti, 397  
*Mexaphaenops* Bolivar, 403  
*Mexisphodrus* Barr, 412  
*Micragra* Chaudoir, 441  
*Micratopus*, 397  
*Micratopus* Casey, 398, 399  
*Micrixys* LeConte, 403, 404  
*Microcalosoma* Breuning, 383  
*Microcarenus* Tschitscherine, 407  
*Microcasnonia* Liebke, 434  
*Microcephalus* Dejean, 407  
*Microlestes* Schmidt-Goebel, 443  
*Microtachys* Casey, 399  
*Microthylax* Rivalier, 374  
*Migadopidius* Jeannel, 385, 386  
*Migadops* Chaudoir, 386  
*Migadops* Waterhouse, 386  
*Mimocasnonia* Liebke, 434  
*Mimodromites* Mateu, 441  
*Mimodromites* s. st., 442  
*Mimodromius* (s. lat.) Chaudoir, 440  
*Mimodromius* (s. st.), 442  
*Mioptachys*, 397  
*Mioptachys* Bates, 398, 399  
*Miscocephalus* Chaudoir, 448, 449  
*Mizotrechus* Bates, 416  
*Molobrus* Putzeys, 388  
*Monnea* Mateu, 443  
*Monolobus* Solier, 385, 386  
*Morio* auct., 405  
*Morion* Latreille, 405  
*Moriosomus* Motschulsky, 405  
*Mormolyce* Hagenbach, 444  
*Myriapoda*, 429  
*Myrmecilla* Lacordaire, 371  
*Mystroceridius* Reichardt, 397  
*Negrea* Mateu, 443  
*Nemaglossa* Solier, 423  
*Nematoglossa* Gemminger & Harold, 424  
*Nematotarsus* Gemminger & Harold, 444  
*Nemotarsus* LeConte, 362, 368, 429, 444  
*Neocalathus* Ball & Nègre, 413  
*Neocalosoma* Breuning, 382, 383  
*Neodrypta* Basilewsky, 362, 368  
*Neohiletus* Jeannel, 357, 384  
*Neopaussus* Thomson, 378  
*Neoreicheia*, 386, 391, 392  
*Neoreichea* Kult, 392  
*Neotachys* Kult, 399  
*Nomius* Laporte, 394  
*Nominus* Motschulsky, 444  
*Nortes* Motschulsky, 410  
*Notaphidius* Jeannel, 400  
*Notaphiellus* Jeannel, 400  
*Notaphus* s. st., 400  
*Notaphus* Stephens, 400  
*Nothanillus* Jeannel, 397  
*Nothocys* Jeannel, 400  
*Notholopha* (s. lat.) Jeannel, 400  
*Notholopha* s. st., 400  
*Nothotrechisibus* Uéno, 403  
*Notiobia*, 411  
*Notiobia* (*Anisotarsus*) Chaudoir, 424  
*Notiobia* (s. lat.) Perty, 423, 424  
*Notiobia* (*Notiobia*) s. st., 424  
*Notiobia* Straneo, 422  
*Notiophilus* Dumeril, 357, 365, 384  
*Notioxenus* Motschulsky, 375  
*Notoperyphus* Bonnaird de Saludo, 401  
*Nototylus* Gemminger & Harold, 375  
*Nototylus* Schaum, 357, 364  
*Nyctosyles* Putzeys, 391  
*Obadius* Burmeister, 391  
*Ochropisus* Bates, 445, 446  
*Ochtozetus* Chaudoir, 401  
*Ocyphus* Gistl, 450  
*Odacantha* Perty, 437  
*Odacanthella* Liebke, 433, 434  
*Odacanthina* Liebke, 434  
*Odacanthomimus* Liebke, 433, 435  
*Odontochila* auct., 373  
*Odontocheila* Castelnau, 370, 373  
*Odontocheila* s. st., 374  
*Odontomerus* Solier, 395  
*Odontoscelis* Curtis, 416  
*Oechalius* Liebke, 440, 442  
*Oenaphelox* Ball, 445, 447  
*Ogmopleura*, 410  
*Ogmopleura* Tschitscherine, 410  
*Ogygium* Liebke, 439, 441  
*Oilea* Liebke, 436, 437

- Olisares Motschulsky, 413  
 Omoglymmius Ganglbauer, 393  
 Omophron Latreille, 355, 363, 378  
 Onota Chaudoir, 431, 441, 442  
*Onychopterygia* Gemminger & Harold, 413  
 Onypterygia Dejean, 413  
 Oodes Bonelli, 418, 419  
 Oodiellus Chaudoir, 419  
 Oodinus Motschulsky, 418, 419  
*Ophionea* Klug, 434  
 Ophryogaster, 410  
 Ophryogaster, Chaudoir, 410  
 Ophryognathus Chaudoir, 347, 431  
 Opilidia Rivalier, 374  
 Opisthencentrus Horn, 373, 374  
 Oreodicastes Maindron, 445, 446  
*Oribas* Dohrn, 409  
*Oribasus* Dohrn, 409  
 Oribazus Chaudoir, 409  
 Otoglossa Chaudoir, 441  
 Oxoides Solier, 443  
 Oxycheila Dejean, 371, 372  
*Oxychila auct.*, 372  
 Oxycrepis Reiche, 409  
 Oxydrepanus, 386, 392  
 Oxydrepanus Putzeys, 391  
*Oxyglossus* Chaudoir, 446  
 Oxygonia Mannerheim, 370, 373, 374  
*Oxystomus* Latreille, 390  
 Oxytrechus Jeannel, 403  
 Ozaena Olivier, 377  
 Pachybaris Straneo, 409  
*Pachymorpha* Hope, 410  
*Pachymorphus* Chaudoir, 410  
 Pachytele, 376  
 Pachytele Perty, 377  
 Pachythecus Chaudoir, 409  
 Pachmophena Jeannel, 400  
 Panageus Latreille, 404  
 Panageus (s. lat.) Latreille, 404  
 Panageus, s. st., 404  
 Paracalosoma Breuning, 382, 383  
 Paraclivina, 391  
 Paracolliuris Liebke, 433, 434  
 Paranecus Dejean, 425, 426  
*Paralimnastis* Jeannel, 399  
*Parallelomorphus* Motschulsky, 389  
 Paranortes Tschitscherine, 410  
 Parapionycha Liebke, 435, 436  
 Paratachys Casey, 398, 399  
*Paratrechus* (s. lat.) Jeannel, 403  
*Paratrechus* (s. st.), 403  
 Paratrechus Jeannel, 403  
 Parhypates Motschulsky, 410  
 Pasimachus Bonelli, 387  
*Pasimachus* (s. lat.) Bonelli, 387  
*Pasimachus* s. st., 387, 388  
 Paussus, 378  
 Pelecium Kirby, 361, 367, 429  
*Pelmatellus* (s. lat.) Bates, 422  
*Pelmatellus* (s. st.), 422  
*Pelmatellus* (Thenarellus Bates), 422  
 Pentacomia Bates, 370, 374  
*Pentagonica* Schmidt-Goebel, 362, 369, 431  
 Percolaus Bates, 409  
*Pericompsus* (s. lat.) LeConte, 399  
 Pericompsus LeConte, 399  
*Pericompsus* (s. st.), 399, 400  
*Periglossium* Liebke, 451  
 Perigona Castelnau, 415, 416  
*Perigona* s. st., 416  
 Perileptus Schaum, 402  
 Peronoscelis Chaudoir, 431  
*Peryphus* (s. lat.) Stephens, 400  
*Peryphus* (s. st.), 400  
*Petrocharis* Ehlers, 397  
 Phacocerus Chaudoir, 439, 441, 442  
*Phaea* Chaudoir, 441  
*Phaedrusium* Liebke, 415, 439  
*Phaeoxantha* Chaudoir, 372  
*Pharamecomorphus* Motschulsky, 389  
*Pheropsophidius* Hubenthal, 453  
*Pheropsophus* (s. lat.) Solier, 453  
*Pheropsophus* (s. st.), 453  
 Phillodroma Lacordaire, 374  
 Philochthus Stephens, 400  
*Philogeus* Blanchard, 404  
 Philophuga Motschulsky, 441  
 Phloeotherates Bates, 445, 446  
*Phloeoxena* (s. lat.) Chaudoir, 445, 447  
*Phloeoxena* (s. st. (pars.)), 445, 447  
 Phyllodroma Lacordaire, 370, 374  
*Phymatocephalus* Schaum, 426  
 Physea, 376, 377, 379  
 Physea Brullé, 375, 377  
*Physeomorpha*, 376  
*Physeomorpha* Ogueta, 376, 377  
*Physeomerus* Chaudoir, 419, 420

- Pinacodera Schaum, 443  
 Pionycha Chaudoir, 436, 437  
 Plagioplatys, 410  
 Plagioplatys Tschitscherine, 410  
 Plagiorhytis Chaudoir, 434  
 Plagiotelum Solier, 436, 437  
*Planesus* Motschulsky, 443  
 Planetes MacLeay, 448  
 Plataphus Motschulsky, 401  
 Platycerozaena Bänninger, 377  
 Platynella, 412  
 Platynella Casey, 412  
 Platynus, 412  
 Platynus Bonelli, 412  
 Platynus (*s. lat.*) Bonelli, 412  
*Platysma* Bonelli, 409  
 Plaumannium Liebke, 413  
 Plectographa Rivalier, 374  
 Pleuracanthus Gray, 450  
*Pleurogenius* Motschulsky, 389  
 Plocamoperyphus Jeannel, 401  
*Plochiocera* Hope, 374  
 Plochionus (*s. lat.*) Latreille & Dejean, 440, 442  
 Polpochila, 422  
 Polpochila (*Phymatocephalus*) Schaum, 425  
 Polpochila (*s. lat.*) Solier, 425, 426  
 Polpochila (*s. st.*), 425, 426  
 Polychaetus Chaudoir, 418  
*Polyderidius* Jeannel, 399  
 Polyderis Motschulsky, 398, 399  
 Polystichus Bonelli, 448, 450  
 Pontona Liebke, 440, 441  
 Prepusa Chaudoir, 370, 373, 374  
*Pristodactyla* Dejean, 411  
 Pristolomus Chaudoir, 446  
 Pristonychus Dejean, 413  
*Pristoscelis* Chaudoir, 409  
*Procephalus* Castelnau, 371  
*Procolliuris* Liebke, 434  
 Progaleritina Jeannel, 447, 448  
 Promecoderus Dejean, 416  
 Promenton Fleutiaux, 374  
 Propionycha Liebke, 436  
 Prostolomis Mateu, 409  
 Prothyma Hope, 374  
 Protopheropsophus Hubenthal, 453  
*Pseudabarisi* Csiki, 409  
 Pseudabarys Chaudoir, 409  
*Pseudaepus* Schweiger, 402  
*Pseudamara* Lindroth, 415  
 Pseudanisotarsus Noonan, 424  
 Pseudaptinus Castelnau, 448  
 Pseudocarbonellia Mateu, 443  
 Pseudocasnonia Liebke, 434  
 Pseudocnides (*s. lat.*) Jeannel, 403  
 Pseudocnides (*s. st.*), 403  
 Pseudocynthidia Straneo, 409  
*Pseudolebia* Basilewsky, 441  
 Pseudometabletus Liebke, 435  
 Pseudomigadops Jeannel, 386  
 Pseudomorpha Kirby, 355, 363, 452  
 Pseudoplagiorhytis Liebke, 434  
 Pseudotrepes Jeannel, 400  
 Pseudotoglossa Mateu, 441  
 Pseudoxycheila Guérin, 372  
*Pseudoxychila* auct., 372  
 Pterodercylus Kuntz, 420  
 Pterostichus, 406, 408, 409, 410  
 Pterostichus Bonelli, 408  
 Pterostichus (*s. lat.*) Bonelli, 409  
 Putzeysiis Jeannel, 403  
*Pycnochila* Motschulsky, 371, 372  
 Pylartesius Liebke, 442  
 Pyramis Putzeys, 391  
 Reichardtula Whitehead, 347, 391  
 Reicheia, 386  
 Rhadine, 412  
 Rhadine LeConté, 412  
*Rhagocrepis* Eschscholtz, 436  
*Rhagodactylus* Chaudoir, 424  
*Rhaminagrobis* Thomson, 372  
*Rhomobodera* Reiche, 431  
 Rhysodes (*s. lat.*) Dalman, 393  
 Rhysodes (*s. st.*), 393  
 Rhysodiastes Grouvelle, 393, 394  
 Rhytidognathus Chaudoir, 385, 386  
*Rhyzodes*, 393  
*Rhyssodes* auct., 393  
 Sagittaria, 419

- Salcedia Fairmaire, 392  
 Scalaphorites Motschulsky, 388, 389  
 Scaphinotus Dejean, 384  
 Scaphinotus Latreille, 359, 365  
*Scaris* Chaudoir, 389  
 Scarites, 405  
 Scarites Fabricius, 388, 389  
 Scarites *s. st.*, 388, 389  
*Scaritidea* Waterhouse, 416  
*Scaritiolus* Fairmaire, 389  
*Scaritodes* Chaudoir, 389  
*Scelodontis* Curtis, 416  
 Schidonychus Klug, 436, 437  
 Schizogenius, 386  
*Schizogenius* (*s. lat.*) Putzeys, 391  
 Schizogenius Putzeys, 386  
*Schizogenius* *s. st.*, 391  
 Scolyptus Putzeys, 390  
 Scopodes Erichson, 431  
*Scythropa* Chaudoir, 439  
*Scythropa* Hope, 372  
*Scythropasus* Chaudoir, 377  
*Selenalius* Casey, 428  
*Selenophorus* Dejean, 428  
*Semiardistomis* Kult, 347, 392  
*Semiclivina* Kult, 391  
*Sericoda* Kirby, 412  
*Setalis* Castelnau, 407  
*Siagona* Latreille, 385  
*Sierrobius* Straneo, 409  
*Solenogenys*, 386  
*Solenogenys* Westwood, 392  
*Somotrichus* Seidlitz, 445, 446  
*Spanus* Westwood, 429  
*Speocolpodes* Barr, 412  
*Sphaeracra* Say, 437  
*Sphaerotachys* Müller, 399  
*Sphalera* Chaudoir, 444  
*Sphallomorpha*, 452  
*Sphenopselaphus* Gemminger & Harold, 444  
*Sphenopalpus* Blanchard, 444  
*Spongoloba* Chaudoir, 440, 441  
*Stenocellus* Casey, 426  
*Stenocheila* Castelnau, 413  
*Stenocnemus* Mannerheim, 412  
*Stenocrepis* (*s. lat.*) Chaudoir, 418, 419  
*Stenocrepis* (*s. st.*), 418, 419  
*Stenoglossa* Chaudoir, 446  
*Stenognathus* (*s. lat.*) Chaudoir, 445, 446  
*Stenognathus* (*s. st.*), 446  
*Stenolophus* (*Agonoderus*) Dejean, 426  
*Stenolophus* (*s. st.*), 426  
*Stenolophus* (*conjunctions* Group), 425  
*Stenomorphon* Semenov, 378  
*Stenomorphus* Dejean, 427, 429  
*Stenonotum* Lacordaire, 441  
*Stenoplatynus*, 412  
*Stenoplatynus* Casey, 412  
*Stenous* Chaudoir, 418, 419  
*Stigmaphorus* Motschulsky, 414  
*Stigmapterus* Motschulsky, 389  
*Stiboloidus* Casey, 424  
*Stolonis* Motschulsky, 408  
*Stomis* Clairville, 407  
*Straneotia* Mateu, 441  
*Stratiotes* Putzeys, 389, 390  
*Stylulites* Jeannel, 397  
*Stylulus* Schaufuss, 397  
*Syleter*, 386  
*Synuchus* Gyllenhal, 411  
*Systolosoma* Solier, 357, 364, 375  
*Tacana* Ball, 445, 447  
*Tachalus* Ball & Nègre, 413  
*Tachycelia* Gistl, 411  
*Tachylopha* Motschulsky, 399  
*Tachymenis*, 396  
*Tachymenis* Motschulsky, 399  
*Tachymenis* Wergman, 399  
*Tachyphanes* Jeannel, 399  
*Tachys* Stephens, 398, 399  
*Tachysalis* Casey, 399  
*Tachysops* Casey, 399  
*Tachyta*, 396  
*Tachyta* Kirby, 398, 399  
*Tachyura* Motschulsky, 399  
*Taeniolobus* Chaudoir, 388, 389  
*Tarulus* Bedel, 443  
*Tarus* Clairville, 443  
*Tecnophilus* Chaudoir, 440  
*Teiresia* Liebke, 441  
*Tetracha* Hope, 372  
*Tetragonoderus* Dejean, 431  
*Tetragonoderus* (*s. lat.*), 431  
*Tetraodes* Blanchard, 396  
*Teukrus* Liebke, 436, 437  
*Thalassobius* Solier, 402  
*Thalpius* LeConte, 448, 449

- Thenarellus Bates, 423  
 Thoasia Liebke, 431, 442  
*Tichonia* Semenov, 407  
 Tichonilla, 403, 407  
 Tichonilla Strand, 403, 407  
 Titaresius Liebke, 440, 441  
*Trachelizus* Solier, 377  
 Trachypachus, 375  
 Trachypachus Motschulsky, 375  
 Trachysarus Reed, 422  
 Trapezodera Casey, 412  
 Trechichomimus Mateu & Nègre, 403  
 Trechinotus Jeannel, 403  
 Trechisibellus Jeannel, 402  
 Trechisiboderus Mateu & Nègre, 402  
 Trechisiboides Uéno, 402  
 Trechisibiorites Jeannel, 402  
 Trechisibitus Bonniard de Saludo, 402  
 Trechisibus, 402  
 Trechisibus (s. lat.) Motschulsky, 402  
 Trechisibus (s. st.), 402  
 Trechus Clairville, 403  
*Trepanotachys* Alluaud, 399  
 Trichognathus Latreille, 447, 448  
 Trichopselaphus Chaudoir, 422, 427, 429  
 Trirammatus, 410  
 Trirammatus Chaudoir, 410  
*Tropidopterus* Gemminger & Harold, 395  
 Tropisternus, 452  
 Tropopsis Solier, 377  
 Tropopterus Solier, 394, 395  
*Tylonotus* Schaum, 375  
 Upocompsus Erwin, 399  
*Variopalpus* Solier, 443  
 Vianasia Mateu, 442  
 Wate Liebke, 436, 437  
 Xenodromius Bates, 443  
 Xystosomus, 396, 397  
 Xystosomus Schaum, 398, 399  
*Zelma* Andrewes, 392  
*Zophium* Gistl, 449  
 Zophium Motschulsky, 449  
*Zuphiosoma* Castelnau, 449  
 Zuphium Latreille, 448, 449  
 FAMILY, SUBFAMILY, TRIBE,  
 SUBTRIBE  
 Acupalpina, 423  
 Agonicini, 379, 429  
 Agonina, 363, 367, 369, 405, 406, 411, 413,  
     444  
 Agonini, 347, 405, 406, 411, 413  
 Agrini, 350, 353, 355, 362, 368, 431  
 Amarini, 350, 353, 361, 367, 379, 415  
 Amorphomerini, 380  
 Anaulacini, 429  
 Anchomenia, 411  
 Anchonoderinae, 415  
 Anchonoderini, 413  
 Anillina, 396, 397  
 Anisodactylina, 422, 423  
 Antarctiina, 410  
 Anthiini, 380  
 Aplothoracina, 380  
 Apotomini, 350, 351, 352, 353, 359, 365,  
     394  
 Apteroessina, 370  
 Aptinina, 452  
 Ardistomina, 386, 387  
 Attini, 376  
 Barypina, 395  
 Bembidiina, 396, 397, 400  
 Bembidiini, 347, 350, 355, 360, 366, 396,  
     402, 415  
 Brachinida, 452  
 Brachinina, 452  
 Brachininae, 348, 350, 351, 378, 452  
 Brachinini, 350, 355, 363, 379, 453  
 Bradycellina, 425  
 Broscina, 395  
 Broscini, 347, 350, 353, 359, 365, 395, 416  
 Calleidina, 437, 439  
*Callidina*, 439  
 Callistidae, 417  
 Callistinae, 417  
 Callistini, 416  
 Calosomina, 380  
*Camaragnathini*, 384  
 Camponotini, 376  
 Carabidae, 347, 348, 349, 350, 351, 352, 353,  
     355, 370, 375, 378, 379, 380, 392, 393,  
     405, 406, 408  
 Carabina, 380  
 Carabinae, 348, 350, 378, 379, 386  
 Carabini, 350, 355, 359, 365, 379, 380, 384  
 Catapiesi, 406, 407  
 Catapiesini, 350, 353, 360, 367, 404, 405  
 Catascopina, 444

- Cerapterina, 377  
 Ceroglossina, 380  
 Chaetogenyina, 406, 408  
 Chlaeniini, 350, 355, 361, 367, 417  
 Cicindelina, 370, 373, 374  
 Cicindelinae, 348, 350, 351, 352, 355, 363, 370, 393  
 Cicindelini, 347, 350, 355, 357, 364, 370, 372  
 Cicindisinae, 348, 350, 375  
 Cicindisini, 350, 353, 357, 364  
 Clivinia, 386, 387, 389, 390, 391, 392  
 Cnemacanthini, 350, 353, 360, 366, 395, 410, 416  
*Colliurini*, 413, 414, 432  
 Colydiidae, 392  
 Collyrini, 370  
 Coptoderina, 444  
 Corsyriini, 379  
 Cratocerina, 407, 425  
 Creobiina, 396  
 Crepidogastrini, 452  
 Ctenodactylini, 350, 353, 362, 368, 432, 435  
 Ctenostomatini, 350, 353, 355, 363, 370, 371  
*Ctenostomini*, 371  
 Cuneiectini, 379  
 Cychrina, 380  
 [Cychrini], 350, 353, 359, 365, 379, 384  
 Cyclosomini, 429  
 Cymindina, 443  
 Cymbionotini, 379  
 Cyrtolaina, 406  
 Dercylidae, 417  
 Dercylina, 418, 419  
 Discoperini, 379  
 Disphaericini, 353, 429  
 Dolichoderinae, 378  
 Dolichoderini, 376, 378  
 Dromicina, 370, 372  
 Dromiina, 443  
 Dryptini, 350, 352, 353, 362, 368, 447, 448  
 Dyschirriina, 386, 387, 390  
 Elaphrini, 379  
 Enceladini, 352, 353, 384, 385  
 Eucheilini, 350, 353, 355, 362, 368, 449, 451  
 Euchronia, 407, 409  
 Forcipitorina, 387, 390, 392  
 Galeritina, 447, 448  
 Galeritini, 350, 353, 355, 363, 369, 447  
 Galerucidiina, 438  
 Gehringiini, 375  
*Granigerini*, 379  
 Graphipterini, 379  
 Gyrinidae, 375  
 Harpalina, 422, 426  
 Harpalini, 347, 350, 355, 361, 367, 411, 422, 423  
 Haliplidae, 375  
 Harpalinae, 379, 452  
*Helluodini*, 380  
 Helluonini, 350, 353, 355, 362, 369, 448, 449, 452  
 Helluomorphina, 449  
 Helluonina, 449  
 Hexagoniini, 353, 435  
 Hiletini, 350, 352, 353, 357, 364, 384  
 Hydrophilidae, 452  
 Idiomorphini, 379  
 Iresina, 370  
 Lachnophorina, 413  
 Lachnophoridae, 413  
 Lachnophorinae, 415  
 Lachnophorini, 350, 353, 355, 363, 369, 406, 408, 413, 414, 435  
 Lebidiina, 438  
 Lebiini, 347, 350, 355, 362, 368, 415, 423, 430, 435, 437, 438, 444, 451  
 Lelupidiina, 448  
 Licinini, 350, 353, 355, 363, 369, 420  
*Limnastina*, 397  
 Loricerini, 350, 353, 359, 365, 384  
 Mantichorini, 370  
 Masoreina, 430  
 Masoreini, 350, 355, 362, 368, 379, 430, 431, 437, 444  
 Mastacina, 452  
 Megacephalina, 372  
 Megacephalini, 350, 353, 355, 357, 364, 370, 371  
 Melisoderi, 395, 406  
 Melisoderina, 394, 395  
*Menzodini*, 401  
 Meonidi, 395, 406  
 Meonidina, 394, 395

- Meonidini, 395  
 Merizodina, 401  
 Merizodini, 395  
 Metiina, 410  
 Metiini, 410  
 Metriinae, 370  
 Micratopina, 397  
*Microcephalina*, 407  
 Migadopidae, 385  
 Migadopini, 350, 351, 353, 359, 365, 385  
 Monolobini, 351, 385  
 Morioni, 406  
 Morionini, 350, 353, 355, 361, 367, 404,  
     405  
 Morionini, 407  
 Mormolycini, 437, 444  
 Myrmicini, 376  
 Nebriini, 379  
 Nemotarsina, 430, 444  
 Nematotarsina, 444  
 Noctuidae, 438  
 Nomiina, 394, 401  
*Nomiini*, 394, 395, 406  
 Notiophilini, 350, 353, 357, 365, 384  
 Nototylinae, 348, 350, 375  
 Nototylini, 350, 351, 353, 357, 364  
 Odacanthini, 350, 355, 362, 368, 431, 432,  
     435, 441  
 Odontocheilina, 373  
 Omina, 372  
 Omophroninae, 348, 350, 378, 393  
 Omophronini, 350, 353, 355, 363, 378  
 Omphreinae, 415  
 Oodina, 418  
 Oodini, 350, 355, 361, 367, 417  
 Oopterina, 401  
 Opisthiini, 379  
 Orthogoniini, 379  
*Oxystomina*, 389  
 Ozaeninae, 376  
 Ozaenini, 350, 353, 355, 357, 364, 376,  
     379  
 Panagaeidae, 403, 407  
 Panagaeinae, 403  
 Panagaeini, 350, 355, 360, 366, 403, 404,  
     407, 429  
 Pasimachina, 387  
 Patriziina, 449  
 Patrobini, 379  
 Paussidae, 375, 376  
 Paussinae, 348, 350, 351, 357, 364, 375, 393  
 Paussini, 350, 352, 353, 357, 364, 376, 377,  
     378  
 Peleciini, 350, 353, 361, 367, 403, 429, 430  
 Pelmatellina, 422, 424  
 Pentagonalini, 350, 355, 362, 369, 431, 442  
 Pericalina, 362, 368, 437, 445  
 Periglossinae, 451  
 Periglossini, 451  
 Perigonidae, 413, 415  
 Perigonini, 350, 353, 355, 363, 369, 415, 435  
 Perileptina, 402  
 Perochnoristhini, 379  
 Peropsophina, 452  
 Physocrotaphini, 380, 449  
 Physoderina, 438  
 Planetina, 447  
 Planetini, 447  
 Platychilina, 371  
 Platynina, 411  
 Pogonini, 350, 355, 360, 366, 401  
 Pogonopsini, 379  
 Pristosiina, 411  
 Promecognathini, 379  
 Prothymina, 370, 373  
 Protopaussini, 376  
 Pseudomorphinae, 348, 350, 378, 379, 451  
 Pseudomorphini, 350, 353, 355, 363, 452  
 Psydri, 406  
 Psydrinae, 363  
 Psydrini, 350, 355, 360, 366, 394, 395, 406  
 Pterostichina, 405, 407, 408  
 Pterostichini, 347, 350, 355, 361, 363, 367,  
     369, 395, 396, 404, 405, 406, 408, 411,  
     413, 421, 444  
 Pyralidae, 438  
 Rhysodidae, 392, 393  
 Rhysodini, 347, 350, 355, 357, 364, 392, 393  
 Salcediina, 387, 392, 393  
 Scapterina, 386  
 Scaritina, 386, 387, 388, 389  
 Scaritinae, 379  
 Scaritini, 347, 350, 351, 355, 359, 365, 386,  
     387, 392, 393  
 Siagonini, 350, 351, 353, 359, 365, 379, 384  
 Sphodrina, 411, 412  
 Stenolophina, 422, 423, 425  
 Stomina, 407

- Synuchina, 411  
Tachyina, 396, 397, 398  
Tetragonoderini, 429  
Teratina, 370  
Tichoniinae, 403  
Trachypachinae, 348, 350, 375  
Trachypachini, 347, 350, 355, 357, 375  
Tetragonoderina, 430, 431  
Theratina, 372  
Thyreopterina, 444  
Tichoniina, 407  
Tichoniitae, 407  
Trechina, 402  
Trechini, 347, 350, 355, 360, 366, 401,  
403  
Trechodina, 402  
Trichoniina, 410  
Trichoniinae, 403  
*Trimerini*, 380  
Tropidopteri, 406  
Tropidopterini, 395  
*Tylonotinae*, 375  
Zabriini, 379  
*Zelmina*, 392  
*Zolini*, 350, 353, 360, 366, 401  
Zuphiina, 448, 449  
Zuphiini, 350, 353, 355, 362, 369, 448,  
450